Volume 73 No 5
May 2005

Amateur Radio

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The magazine for AUSTRALIAN radio amateurs

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plus

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Our Cover this month

"Over the weekend of 2 and 3 April, 2005 REAST (Radio and Electronics Association of Southern Tasmania) displayed and promoted amateur radio and electronics to thousands of people at the biennial Model Makers and Collectors exhibition at the Derwent Entertainment Centre."

Read the whole story in "News from..." VK7 on page 36 and 37

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues

Back issues are available directly from the WIA National Office (until stocks are exhausted), at $4.00 each (including postage within Australia) to members.

Photostat copies

When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society
Founded 1910

Representing
The Australian Amateur Radio Service

Member of the
International Amateur Radio Union

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Editorial comment

Colwyn Low VK5UE

Activity month

I have been busy making things (including the usual range of mistakes) in April.

I built the Aerial Analyser described by Jim Tregellas VK5JST on page 5 of this issue. Mine works exactly as described and I am very pleased with it. However as with all kits you need to take care at every step to have the correct components and make sure the solder joints are well made and that you have not bridged tracks, if you use a printed circuit board.

Another project I have had sitting around for nearly a year is the power meter described in QST June 2001 on page 38 using an Analog Devices AD8307 with a logarithmic output. It can measure nanowatts to 100 watts. This has not been plain sailing due to my lack of attention. How did I have a 6.8 kΩ resistor instead of a 6.8 Ω? Why did I try to connect to a pin 1 on an IC when it should have been a pin 8? Bother, I will just have to accept that I am not perfect!

I had a great time in the bush with John Moyle Field Day. Four of us from the Elizabeth ARC went out on the field day each with a complete station and operated as we felt fit between two sites north east of Adelaide. My "Beetle with antennae" is shown on the inside back cover. I am still sorting out how to sleep comfortably in it. First you do have to remove the backs from the passenger and back seats and then pad up the passenger side of the car. With the correct matressing it is great. We cooked with gas where we were allowed and power came from car batteries and GMC 750/850 watt, 2 stroke generators.

The WIA National first AGM will be about to be held or has just been held when you read this. The organisation is settling down. The flow of information through the WIA website confirms that the board is kept very busy. I have great admiration for Michael Owen, who is apparently everywhere in Australia on amateur radio business and is still able to make a living at his "real job". The amount of work done by volunteers to keep amateur radio afloat is enormous. There are only two paid staff in the Melbourne National office, every thing else in done in donated time. As it said in a Summerland ARC newsletter, "JOIN THE WIA. Be a MEMBER and NOT a MOANER."

The flow of material to be published in AR is slowing so please use the winter months to sit down and share what you get up to in amateur radio. I am usually short of front cover material. I need a good balanced contrast picture and a story to go with it. June AR will be the annual "Women in radio" issue. I have a picture and a story to go with it for July but after that?

In closing, the Harry Angel Sprint was held on a very noisy 80 m band but in the true amateur spirit we all soldiered on and I heard scores near 40 early on. I got 11 contacts. So please get your log in if you participated.

Good DX and local chats,
73 Colwyn VK5UE

NOTICE is hereby given that the ANNUAL GENERAL MEETING of
The Wireless Institute of Australia
to be held at 2.00 p.m. on Saturday 7 May 2005 will now be held at:
the Italo Australian Club 78 Franklin St Forrest ACT,
and not as previouslyadvised.

We do hope that this unavoidable change of venue will not cause any inconvenience, but the new venue for the Meeting is at the Italo Australian

Club where the Annual Dinner will be held at 7 p.m. We do hope to see as many members and their partners as possible at the Dinner as well as at the Annual General Meeting and the Open Forum. his venue also gives us the opportunity to speak with fellow members in a friendly environment before the dinner, and ***don't forget to book for dinner.***

Michael Owen VK3KI

"The WIA has never done anything for me!"

We have all heard that said.

I have been involved in the IARU and IARU Region 3, the ITU and the WIA, both in the past and now more recently. For many years until about a year ago, I really had looked at the WIA with the eyes of an outsider, and now for 11 months or so as the WIA national (not as I once was, Federal) President.

So, partly with the eyes of an outsider, how do I react to that assertion?

One problem in responding to a statement like that is that amateur radio is just such a mix of intense interests that the WIA finds it hard to meet all of those needs.

The WIA provides a QSL service for all members at no cost to the members. Great, if you are keen on QSLs, but what if you are not interested?

The WIA VK1WIA broadcasts once a week provide, I think, brilliant information and comment, covering the whole country. Great, if you want to and are able to listen to the broadcasts, but what if you really cannot get to hear them, or you just don't want to?

The WIA provides members with what is today the only amateur radio magazine in Australia, with worthwhile technical articles and information as well as information about state and regional activities. Great, but what if you really don't think out of date print media fits within the modern world, and anyway the photographs are too often not really good enough?

The WIA provides continuing and up dated information about what it is doing and what others are doing affecting amateur radio through its website. Great, but what if you are one of the 25% (I am told) of members who do not have access to the Internet?

The WIA sponsors various awards and contests. But what if you couldn't care less about awards or contests?

The WIA provides, through the clubs, (at least at present) an examination system that enables most people to qualify as an amateur almost anywhere in the Commonwealth. Great, but what if you already have an unrestricted licence and don't have to qualify, and you did so all by yourself, and you didn't need any help from anything the WIA did, and anyway more amateurs just means more interference?

I believe that the WIA must provide services for its members, and while I accept that, because of that very diversity of interests, most things that we do provide will be of interest to only some of our members.

But, that is only part of what the WIA does.

The core responsibility of the WIA, its primary object, is to "to promote, advance and represent in any way it thinks fit Amateur Radio and the interests of Radio Amateurs", which if the WIA is effective, must be for the benefit of all radio amateurs, whether or not they are members.

But why do we need a WIA to do that?

The regulation of the spectrum nationally and internationally is complex.

In Australia, the role of the ACA is to develop a national position on the allocation of the spectrum, and it does so by involving various interests. It deals with one defence department, two telcos, one Television Australia, one aviation department, and so on. It cannot and will not deal with 14,000 individual amateur licensees. It deals with one body, and that body is the WIA.

Internationally, there can only be one national radio society from each country that is a member of the IARU, the International Amateur Radio Union, the surprisingly influential representative of the world's amateurs to the International Telecommunications Union, the ITU. The Australian national radio society is the WIA.

The WIA is also a member of the IARU Region 3 organisation. Part of every WIA member's subscription goes to IARU Region 3, and a small part of that goes on to the IARU.

Please don't underestimate the importance to the amateurs of Australia of having a strong and effective representative body.

Part of the story of the 40 metre band at the last ITU World Radiocommunications Conference in 2003, the WRC03, when against all odds, the band 7.1 to 7.2 MHz was allocated to the amateur service in Regions 1 and 3, is that that only happened after Australia changed its position in the dying hours of the 4 week treaty conference.

There were two members of the Australian delegation who were there representing the amateur service.

We had two amateur delegates because the WIA is recognised by the ACA as the body representing amateurs and so was able to nominate 2 members of the delegation to the ACA.

One was funded completely by the WIA.

And preparation for the next WRC, WRC 07, is already well under way and the WIA is fully involved.

That is why I believe that a single strong WIA is essential to our survival.

That is why I believe that over the years the WIA has done much for every Australian radio amateur, and the assertion that "the WIA has never done anything for me" is just not right.

Let me be very clear about this: I know and accept that the WIA just cannot reflect the view of every amateur on every issue.

But it is no answer to say I won't be a member because I didn't agree with the WIA policy in relation to a particular matter. We do all agree on certain fundamental matters, such as the allocation of our bands, and the retention of our basic privileges, the threat of BPL and the like.

That is why I can ask every amateur to be a member of the WIA.

The other answer, the WIA will do it anyway, whether or not I am a member is also no answer. The more amateurs who are members of the WIA the more the WIA has credibility as representing Australian radio amateurs. And, without members the WIA will not have the funds to do what it should do.

That is why I should ask every amateur to be a member of the WIA.

ar

WIA news

WIA Board meets

The WIA Board met in Sydney on Friday 8 and Saturday 9 April 2005.

The Board conducts its day-to-day business by phone and email and written resolutions, and so this was its first formal face-to-face meeting this year.

Considerable time over the two days was devoted to reviewing the office, and it was decided that it was essential to allocate a part of this year's budget to new equipment, furniture, software and hardware.

QSL operations

The WIA Board decided to maintain existing structures and operations to meet its promise to provide WIA Members with a no cost QSL service.

Inwards QSL will continue to be directed to the internationally advertised PO Box or other address. The Westlakes Amateur Radio Club will be the focal point for Outwards QSL operations.

QSL Bureaus will operate on a reimbursement basis. General instructions and the Expense Claim form are available on the WIA website.

Advisory Committees

The Board reviewed the present WIA structure, and decided to create a new Advisory Committee for the Northern Territory, as recommended by WIA President, Michael Owen, VK3KI, following his recent visit, and to use that as a model for the rules for other Advisory Committees when elections become due.

The Board also decided to seek to enhance its lines of communications with all Advisory Committees.

Budget for 2005 year

The WIA Board has agreed on a budget for the current WIA financial year, including allowances for monitoring the BPL trials, developing and printing a Foundation Licence Manual, training assessors for the Foundation Licence and for meeting the WIA's obligations under the various Implementation Agreements.

WIA Board Reviews Membership Fees and Categories

The WIA Board has reviewed current membership categories and subscriptions and decided to create a new membership category, which will be called a "Family Membership".

The Board also decided to offer a 5-year subscription for all categories of membership, but not to change any existing subscription rates.

Details will be included with next billing cycles renewal notices and on the WIA website.

WIA to establish a Club Grants Scheme

WIA Board has decided to establish a Club Grant Scheme, whereby Affiliated Clubs with at least 50% WIA membership would be able to lodge submissions seeking a grant in the 2006 calendar year for a particular purpose.

Subject only to unforseen budget constraints, at least $1,500 would allocated for this purpose in the 2006 financial year.

The WIA will announce further details once they are finalised

WIA Board reviews and adopts Merit Award Rules

The WIA Board has slightly modified the rules for the WIA Merit Awards.

These awards are Honorary Life Membership, the G A Taylor Medallion award, the Ron Wilkinson Achievement Award made possible through the generosity of Mrs Mary Wilkinson, widow of the late Ron Wilkinson VK3AKC and the President's Commendation.

Details of the awards and the rules will be published on the WIA website.

The Board is making two awards this year and they will be announced at the Annual General Meeting and Annual Dinner in Canberra on 7 May 2005.

New ITU Block for the Cook Islands

The ARRL reports that New Zealand has received a callsign prefix block, E5A - E5Z, from the ITU for the exclusive use of the Cook Islands. This makes the Cook Islands a "political entity" for DXCC purposes.

St Martin's Lutheran College, Mt Gambier, talks to the ISS

The Amateur Radio International Space Station contact between the international space station and St Martins Lutheran College in Mt Gambier, South Australia on Thursday March 17th 2005 was a great success. Ten students ranging from reception to year nine asked Astronaut Leroy Chiao all the twenty questions scheduled with around twenty seconds to spare before the ISS slipped below the horizon.

The telebridge link was handled by Nancy, WH6PN in Hawaii, and after the ISS had passed Tony, VK5ZAI answered questions from parents and guests.

The evening was covered by TV, radio and local press.

This was the seventh Australian school to have taken part in the ARISS.

The Oxley Region 30th Annual Field Day Port Macquarie 11 and 12 June 11

This year the very popular New South Wales mid coast field day will be held over the weekend of June 11 and 12 at the picturesque coastal resort of Port Macquarie. The organisers say that this year's field day will be the biggest and best, featuring several events with a total prize value of over $5,000.00. WIA President, Michael Owen, VK3KI, will be the guest speaker at the dinner on Saturday night.

ACA identify high levels of interference in Moruya NSW BPL Trial

The Australian Communications Authority (ACA) have published a report on the Wommera Consortium BPL field trial in Moruya NSW.

Following the ACA report, Owen Duffy, VK1OD, has presented an analysis of the observed electromagnetic radiation from the trial, with reference to interference to amateur radio operation.

He concludes that "An amateur radio station located in a residential environment where a similar BPL system was deployed would not be safely able to transmit at all on 3.6 MHz and 21 MHz bands because of the high risk of interference to possibly active stations that would not be heard through the BPL interference, effectively curtailing all activity on the band by such a station".

The report also concludes that frequency "notching" as demonstrated in the Moruya trial is not an effective measure against the substantial interference observed from BPL trials thus far.

continued on page 29

An experimental HF aerial analyser

Jim Tregellas VK5JST

Ever wondered about that SWR meter and whether it is really telling the truth? Like to develop whips and dipoles? Well, me too. But to make measurements like these, one needs an aerial analyser to measure impedance and frequency. Because I like fooling around with electronics, out of sheer bloody mindedness I decided to roll my own. Here is the result - and may the force be with you.

The theory

I did a lot of scratching around to find a test circuit which would allow the simple measurement of impedance at different frequencies. For a start, I looked at things like bridges and network analysers. Network analysers typically use 6 port circulators to measure impedance (arghh!) and bridges usually require the simultaneous optimization of two variables to get a result, together with lots of tweaks and fiddles to get them to work properly over a wide frequency range (arghhh again!). So what to use? It was pretty obvious that whatever I did, a microprocessor was going to be involved to do frequency counting and cope with the calculations.

What eventually evolved was a simple circuit in which a resistor was placed in series between the frequency generator and the load. The generator output voltage is measured, as is the voltage across the series resistor (the current) and the voltage across the load. This data is sufficient to allow calculation of the load resistance and the MAGNITUDE (but not sign) of the series load reactance. It leaves the question as to how to determine whether the series load reactance is capacitive or inductive. To answer that, the user simply changes the frequency slightly. If the magnitude of the series reactance increases as the frequency is moved upwards, then the series reactance is an inductor. And vice versa for a capacitor. So there was the basic operating principle, and figure 1 shows the mathematics the microprocessor must use to calculate load resistance, load reactance and SWR. Of course, as in all things technical, it is never quite that simple and it is here that the plot gets bloody.

Photo 1. The Aerial Analyser in action.

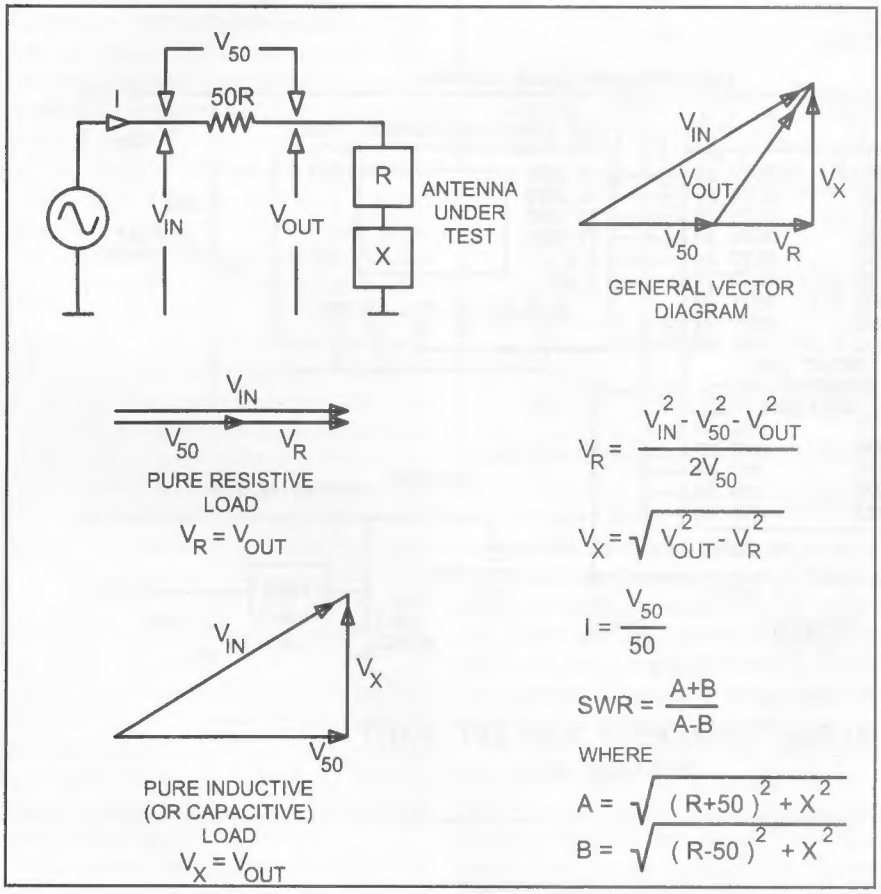

Fig 1. Mathematics used to calculate load resistance.

How it works:

The process starts with an RF signal generator. This must provide a stable, flat, high level sinusoidal output into the test circuit, combined with a low output impedance. The need for frequency stability is obvious, while the low output impedance and flat output characteristic guarantee that the largest possible signal will be injected into the microprocessor analogue to digital converter inputs.

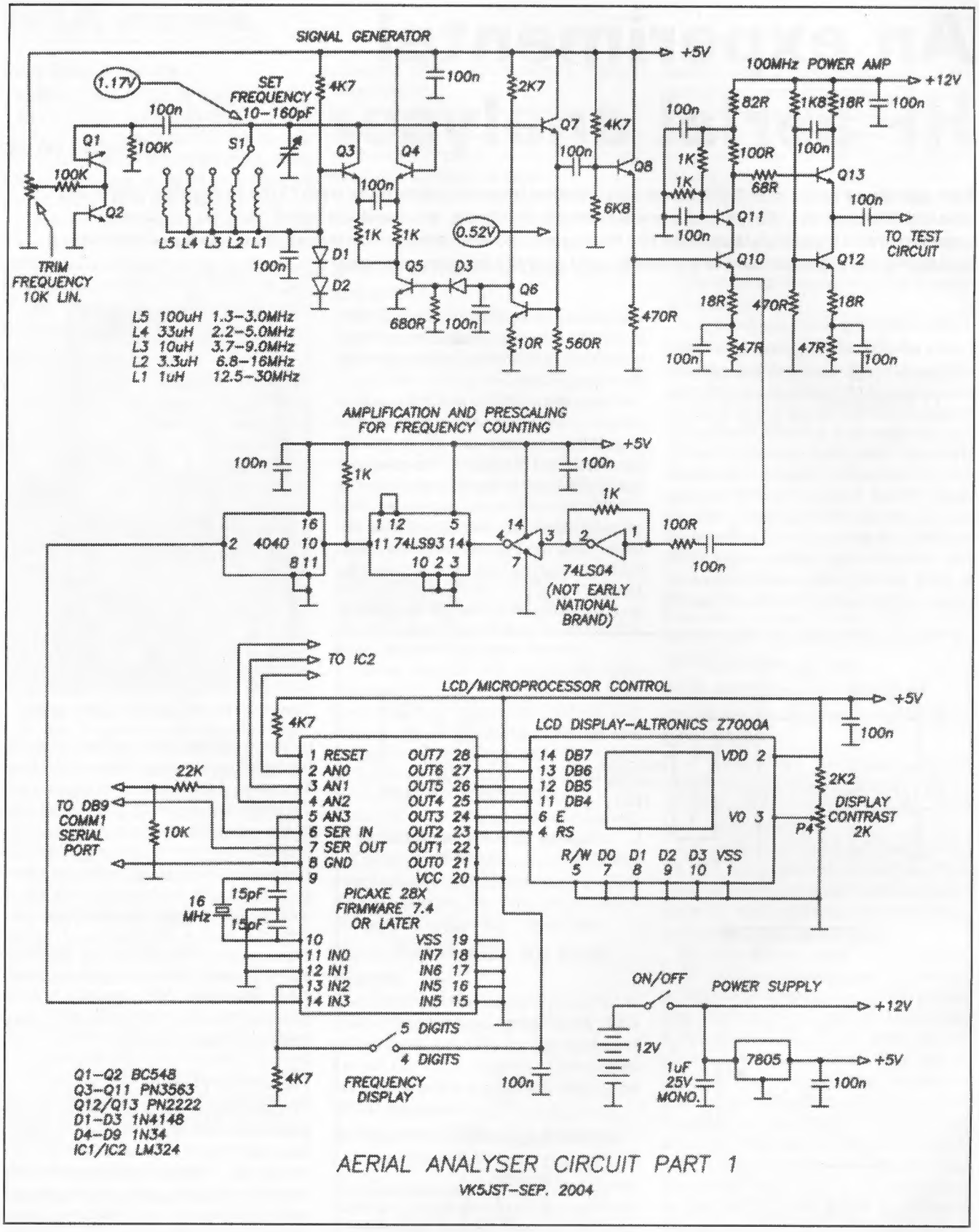

Fig 2. Aerial Analyser circuit diagram part 1.

This, in turn, ensures that independent of the load applied to the test circuit, the calculations will have maximum accuracy. The sinusoidal output ensures that the measurement occurs only at a single frequency and is not upset by what happens at harmonics of the generator frequency.

These goals are attained by using an RF oscillator with an AGC circuit. Q3 and Q4 provide broadband gain (coupled collector to base then emitter to emitter), and the frequency of oscillation is set by the variable 160pf tuning capacitor and inductors L1 – L5. Fine tuning is provided by back to back varicap diodes fabricated from the reversed biased collector base junctions of Q1 and Q2. The level of oscillation is set by the current flowing through Q1 and Q2, which in turn is set by the AGC circuitry Q5 and Q6. At switch-on when there is no oscillation, the 2k7 resistor in the collector of Q6 turns Q5 hard on causing maximum current through Q3 and Q4, and hence rapid build up of oscillation. As the oscillation increases, Q6 collector potential falls, starving Q5 of base potential and hence limiting the current through Q3 and Q4. This process stabilizes the level of oscillation. AGC action is excellent – the AGC amplifier Q5 has a gain of over 200 – and the result is a very constant level of oscillation at the emitter of Q7 of around 600 mV p-p.

This output is then buffered and amplified by a wideband power amplifier, comprising Q8 through Q13. The amplifier provides a voltage gain of 5, and an output impedance of a few ohms to drive the test circuit with around 3 V p-p. The emitter follower Q8 provides a low impedance drive to a cascode voltage amplifier Q10 and Q11 (the cascode structure eliminates Miller effect and ensures a very wide bandwidth). These transistors in turn drive an emitter follower Q13 with active pull down Q12, ensuring equal current source and sink capabilities. The 100 MHz bandwidth ensures the RF drive level to the test circuit remains ruler flat to 30 MHz.

Drive for the frequency counting function of the microprocessor is stolen from the emitter of Q10, and is amplified and buffered using a 74LS04. This is then divided by 1024 in the 74LS93 and 4040 following.

Dual gating intervals are provided for frequency counting of around 0.1 sec and 1 sec under the control of a logic level on pin 13 of the microprocessor. The rapid gating interval allows the user to "track" and easily set the generator frequency, while the longer gating interval allows the accurate frequency measurements which are sometimes necessary.

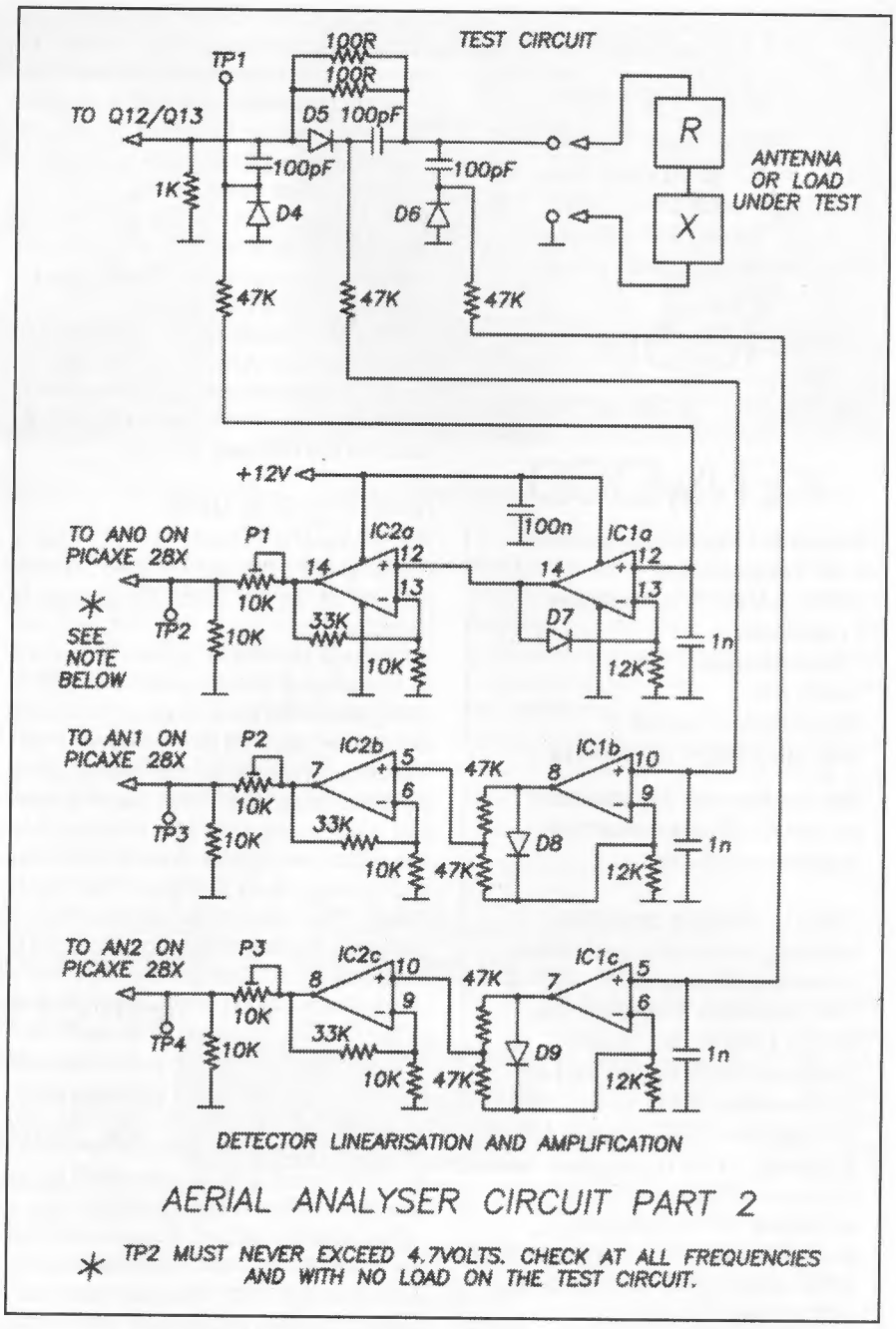

Fig 3. Aerial analyserr circuit diagram part 2.

The 3 voltages discussed previously in the "Theory" section are derived from the test circuit using germanium diode envelope detectors. Note that only point contact germanium diodes can be used here (D4 – D9) as despite what the schools teach, germanium diodes have a zero turn on potential provided the load resistance they drive is high enough (in this circuit around 50 megohms). This is not the case with silicon diodes (with turn on potentials around 500 mV) or even with the best "zero bias" hot carrier diodes which actually have turn on potentials of around 100 mV. For VSWRs of around 10 (a 5 ohm load on the test circuit) only about 150mV peak will be applied to D6. For accurate calculation, it is very

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important to have linear detection. Even with germanium diodes, the bottom end of the detector characteristic is very non-linear and must be linearised somehow. This is achieved by using the diode characteristic against itself in negative feedback loops around IC1a, b, and c. By the way, 1N34 diodes are readily available from Aztronics Pty. Ltd., in Adelaide. Alternatively OA91s can be used, but do not mix types.

The three resulting DC voltages are applied to the A/D converter inputs of the microprocessor where much software muscle is then applied to produce the relevant displays.

Making the unit

Unfortunately, there is no way that a single sided PCB can be used for this project, as an excellent RF ground is necessary.

To make the board, the track pattern is transferred to one side of the PCB using one of the photographic processes available, and Riston coated PCB. Alternatively, it can be transferred using a photocopier, clay based photo paper, and a hot steam iron (see Silicon Chip Feb 2001) or Jaycars Press'n'Peel film and a steam iron (Silicon Chip April 2004). The other side of the PCB is protected during etching by covering it completely with Contact film (as used to cover school books). By the way, if either of the last two methods of manufacture is used, the track image published will have to be horizontally "flipped" to be useful. Note that all artworks and software for this project are available on the author's web site (see the "On the Internet" section of this article.)

The board is etched, turned over, and the Contact removed. It is then counter-drilled using a 1/8th inch (3.2 mm dia.) drill to insulate component leads from the ground plane. Note that some holes are not counter-drilled (see ground plane pattern) to allow the earthing to the ground plane of various parts of the PC track pattern via wire links. Finally the board is carefully cleaned and dried, and protected against attack by spraying it with one of the proprietary solder-through spray lacquers (Electrolube or similar).

The instrument case is then fabricated. The drilled PCB can be used as a template to accurately mark and drill the box front panel for all terminals, mounting pillars and switches. After this is done, carefully use a wood chisel to remove the internal reinforcing ribs at either end of the Jaycar box specified, so that the battery holder will fit.

The components are then mounted on the PCB starting with the lowest profile items and working upwards. As mentioned previously, use only one diode type for D4-D9, and also only transistors with identical type numbers for Q3-Q7. Use IC sockets. This allows progressive testing of the circuitry rather than the "apply power to everything and hope" approach. Check all your soldering and components very carefully, particularly those which will appear under the LCD when mounted.

Soldering the LCD into position is a bit of a trick, and I would suggest that you correctly position the display first relative to the PCB by using 6 mm thick polystyrene foam as a spacer, and two lengths of 0.5 mm dia. TCW at either end of the LCD pinout. The display is locked into final position by soldering both ends of each wire. Having correctly positioned the display, you can then make all the other connections between PCB and display by dropping short lengths of 0.5 mm TCW through the matching hole sets, soldering, and then trimming off the excess - use of 0.5 mm wire is highly recommended as this will allow the LCD to be hinged away from the main PCB in the event of an error. The next thing to be done is to cut the hole in the front panel for the LCD. The back of the Jaycar box has a rectangular marking-out grid moulded into it which greatly assists this process. Stick four pieces of Blu-Tack on the rear of the front panel roughly where the corners of the LCD will be and then using the main switch shaft and front panel hole for it as a locator, press the LCD corners into the Blu-Tack. Remove the PCB, mark out a rectangle on the rear of the front panel using a sharp knife and the Blu-Tack data and cut the hole for the LCD.

The board is then mounted on the front panel. It is supported at one end using countersunk screws and 10 mm long nylon spacers, while the other end is supported by the two test terminals. The two C&K switches are fitted and the front panel label then stuck to the front panel using double-sided adhesive tape. The bottom of the case will need to be relieved so that the knob on the main tuning capacitor can protrude from the side of the case. Likewise the case

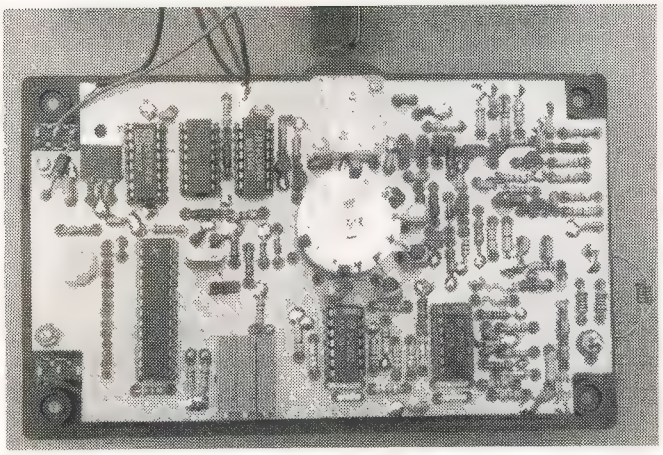

Photo 2. View of the Aerial analyser PCB from the component side.

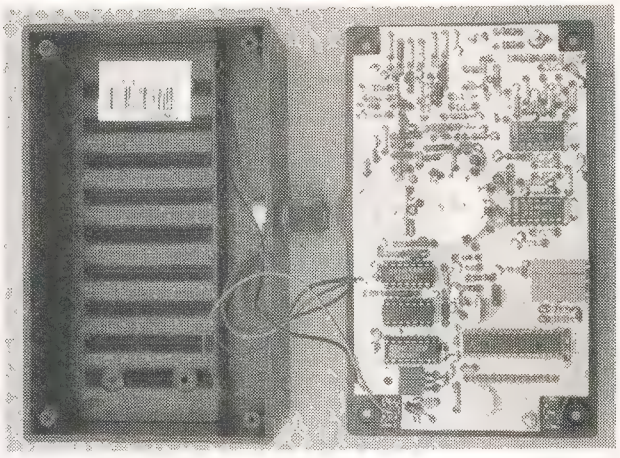

Photo 3. The Aerial Analyser board out of the case.

bottom must be drilled to accommodate the miniature fine-tuning potentiometer which mounts next to the batteries in the case bottom. This completes all work on the case.

Set up and testing

With all ICs unplugged, apply 12 volt to the PCB. Check the output of the 5 volt regulator with a multimeter (4.75- 5.25 Vdc). The top line of the LCD should display all black squares (or perhaps total garbage) when the display contrast pot is varied. Use an oscilloscope fitted with an X10 probe to monitor the emitter of Q7. A clean sine wave at a level of 600 mV p-p +/- 10% should be present, independent of the frequency selected. With the "TRIM FREQUENCY" pot set centrally, the main tuning capacitor set to minimum, and the 12.5 to 30 MHz range selected, use the trimmer on the main tuning capacitor to set the output frequency to 31 MHz. Now check the frequency coverage on all ranges. Set the frequency to about 2 MHz and monitor the emitter of Q13 (or the hot output terminal) with the CRO probe. With no load on the test circuit, around 3 V p-p of clean sine wave should appear here.

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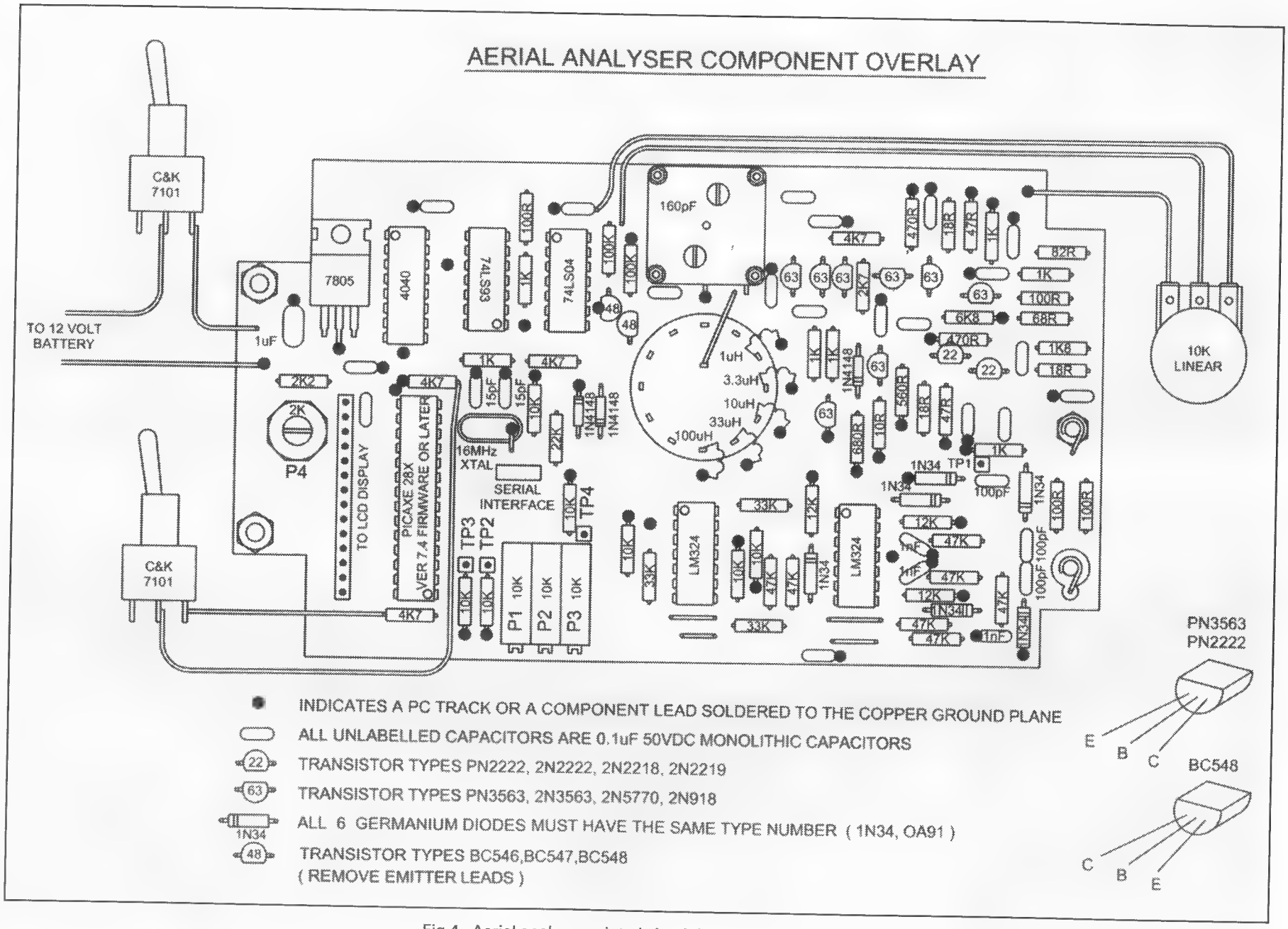

Fig 4 . Aerial analyser printed circuit board component overlay.

Plug in the 74LSO4, 74LS93, and 4040. Around 2 kHz of 5 V p-p square wave should be present at pin 14 of the PICAXE 28X if the pre-scaler is working correctly. Check pre-scaler operation (divide by 1024) on all other frequency ranges and then re-set the frequency to around 2 MHz. There may be a problem here. Some manufacturer's 74LS04 chips are notably slow and low on gain when used as linear inverters. No problems have been experienced with chips from Texas Instruments (SN74LS04), Hitachi (HD74LS04), and Fairchild (F74LS04), but there are problems with early date code batches (middle to late 1980's) from National (DM74LS04) and Mitsubishi (M74LS04). Check with your scope and X10 probe at the output of the second inverter for a 3 V p-p "square" wave at 30 MHz min. if there is a problem. Similarly, some 74LS93 chips do not meet industry wide speed specs. The 74LS93 has a minimum published clock rate of 32 MHz, and apart from the 74LS196 which is not readily available, is fastest counter in the 74LS family. Again, no problems have been experienced with TI, Hitachi, and Fairchild. But all of this is an excellent reason to use IC sockets. It will save hacking your PCB around if there are problems. DO NOT use any other logic family, e.g. 74, 74F, 74HC, etc. None of these will work with the published component values, and the 74F/74HC families will not work as stable wideband linear inverters under any circumstances. And yes, the author is aware that the 4040 is being used slightly above the minimum published clock rate at 5 volts, but the chip is being used with only one standard load (not 10 standard loads at which the testing is done). Furthermore, the maximum clock rate applied to the chip is 1.875 MHz , and no chip of any brand tested so far, has been slower than 6.5 MHz. The reason for using the 4040 is simply to save precious battery power.

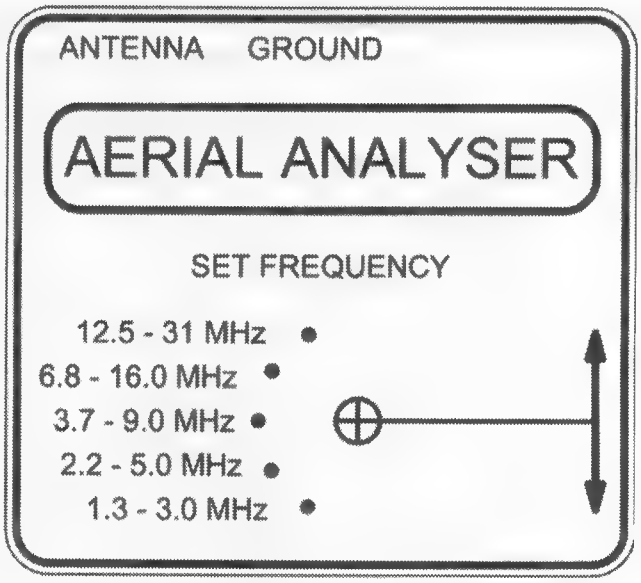

Fig 5. Front panel label for the Aerial Analyser

Plug in both LM324s and connect two 100 ohm 1% ¼ watt metal film resistors across the test terminals (50 ohms). Monitor TP2 with a DVM and adjust P1 until a DC voltage of exactly 4.50 volts appears. Then adjust P2 and P3 until exactly 2.25 volts appears at TP3 and TP4 when checked with the DVM. This completes calibration.

Loading the microprocessor

In comparison to almost everything else on the market, loading PICAXE code is beautifully simple. First you must make up a 3-wire cable to connect the COM1 serial output port on your Windows computer to the input connector on the PICAXE. See the PICAXE website www.rev-ed.co.uk/picaxe/ for details. The incredibly complex two-resistor

Parts list

Resistors (all 0.25W 5%)

1 @ 10R
3 @ 18R
2 @ 47R
1 @ 68R
1 @ 82R
4 @ 100R
2 @ 470R
1 @ 560R
1 @ 680R
7 @ 1K
1 @ 1K8
1 @ 2K2
1 @ 2K7
4 @ 4K7
1 @ 6K8
7 @ 10K
3 @ 12K
1 @ 22K
3 @ 33K
7 @ 47K
2 @ 100K

Pots and trimpots

1 @ 10K linear 16mm pot. and knob
3 @ 10K multiturn cermet trimpots Jaycar RT 4614
1 @ 2K trimpot Jaycar RT 4356

Capacitors

2 @ 15pF NPO 50V ceramic
3 @ 100pF 50V ceramic
1 @ 160pF variable cap. Jaycar RV 5728
3 @ 1nF 50V ceramic
19 @ 0.1uF 50V monolithic
1 @ 1uF 50V monolithic

Inductors

1 @ 1uH RFC Jaycar LF1510
1 @ 3.3uH RFC Jaycar LF1516
1 @ 10uH RFC Jaycar LF1522
1 @ 33uH RFC Jaycar LF1528
1 @ 100uH RFC Jaycar LF1534

Semiconductors

2 @ BC548 or equiv.
8 @ PN3563 or equiv.
2 @ PN2222 or equiv.
6 @ 1N34 or equiv.
3 @ 1N4148 or equiv.
2 @ LM324
1 @ 74LS04- see text
1 @ 74LS93- see text
1 @ 4040
1 @ 7805
1 @ PICAXE 28X (with ver.7.4 or later firmware to support 16 MHz clock and 256 gosubs)

Hardware

1 @ liquid crystal display Aitronics Z7000A
2 @ C&K type 7101 SPST switches or equiv.
1 @ 12 position single pole min. rotary switch and knob
2 @ 10mm long 3mm bore nylon standoffs
1 @ red 4mm binding post terminal Jaycar PT0453
1 @ black 4mm binding post terminal Jaycar PT0454
4 @ 14 pin DIL IC sockets
1 @ 16 pin DIL IC socket
1 @ 28 pin DIL IC socket
1 @ 10X AA battery holder Jaycar PH9210
8 @ AA zinc carbon batteries (or 10 alkaline)
1 @ Jiffy box Jaycar HB6011
1 @ PCB
1 @ front panel label
1 @ 16 MHz quartz crystal
miscellaneous 3mm screws and nuts, hookup wire, insulated sleeving, pc pins, solder

On the Internet

Coding for the PICAXE 28X microprocessor, and the masters for the printed circuit board, are now available at http://www.users.on.net/~endsodds/

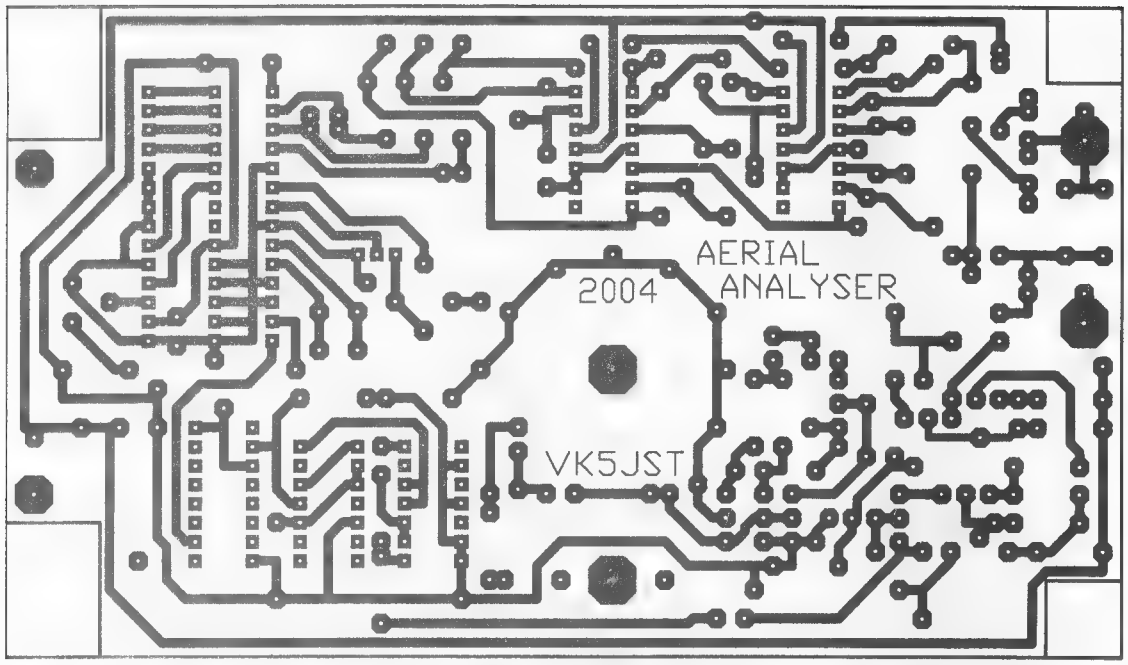

Fig 6. Printed circuit board track pattern.

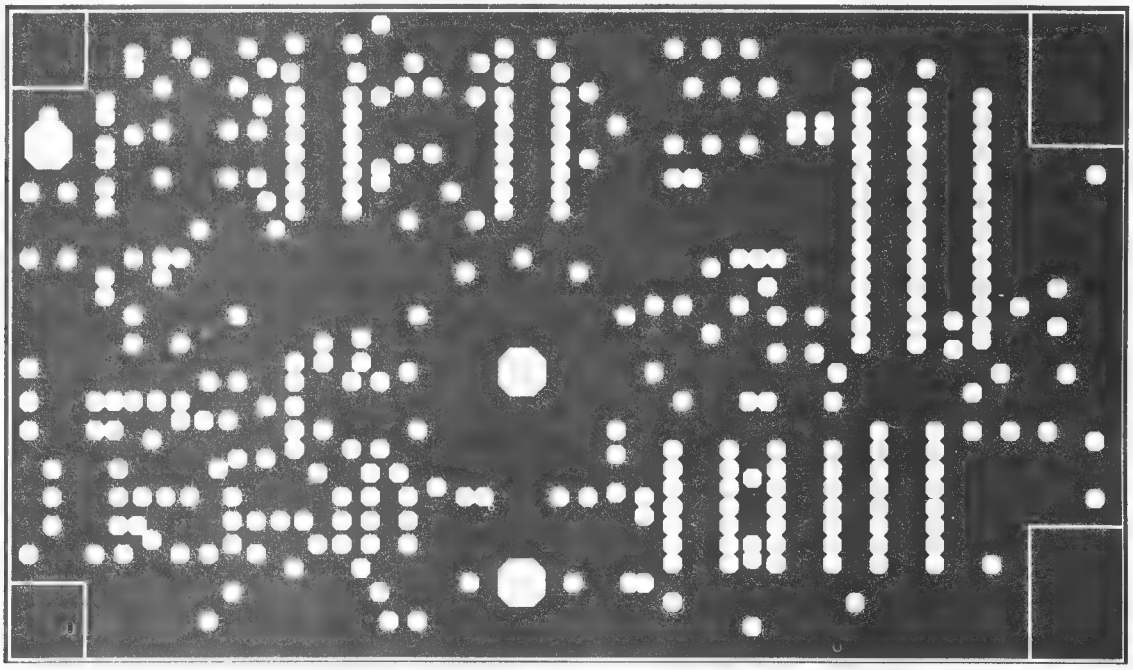

Fig 7. PCB ground plane, printed in the negative.

interface for the micro is included on the PCB.

Next you must download the 19 Mb file BAS805.EXE from the website. When expanded in Windows, this file provides the Programming Editor, used to load data into the EEPROM of any of the Picaxe chip family.

Last, download the file 5diganlsr.bas from my website and put it into the folder containing the Programme Editor.

Open the Programming Editor, select the PICAXE 28X chip with 16 MHz clock rate and 256 gosub options, and open the file 5diganlsr.bas. Connect the 3-wire cable from COM1 to the PICAXE interface connector of the PCB, switch on power to the PICAXE, and select RUN in the Programming Editor. The code will now be squirted into the EEPROM in the micro if all is well.

Your analyser should now be alive! It should be displaying a 4 or 5 digit frequency of around 2 MHz, R=050 ohms, X=000 ohms, and SWR=1.00. Recheck all your calibrations and the battery drain (around 100 mA total). Depending on the circuit conditions for which your crystal was made, you may wish to slightly change the count periods specified in the "count" statements in the software so that the analyser shows the correct frequency. Connect a 300

Aerial Analyser kits

Kits for this project are available from:

Elizabeth Amateur Radio Club
PO Box 8
Elizabeth SA 5112
email:
keith.gooley@dsto.defence.gov.au

Price is *$117* with an engraved front panel

and *$103* with a silk screened box lid, postage included.

Keith Gooley
VK5OQ

Amateur Radio Magazine Awards 2004

The Higginbotham Award

The Higginbotham Award for service to amateur radio generally, not necessarily to the magazine goes to Drew Diamond VK3XU for his service to the hobby of amateur radio with the excellence of hs contributions to Amateur Radio magazine.

He writes on a variety of subjects.

All projects come with the reputation that if Drew designed and built it, it works.

The Amateur Radio Technical Award

The Amateur Radio Technical Award for the best technical article published in 2004 goes to Dale Hughes VK2DSH for a series of articles published throughout the year, in particular "A high performance 1 kHz to 25 MHz signal generator" published in February 2004.

An experimental HF antenna analyser *continued*

mm length of hook up wire between the test terminals and select a frequency of around 30 MHz. Depending on the wire diameter, the skin effect resistance will be around 4-10 ohms and the inductive reactance around 80 ohms. When the wire is disconnected the instrument will display the reactance and loss resistance of the few pF of stray capacitance in the test circuit and will not indicate an open circuit until the frequency falls below 25 MHz. However, the reactances of these strays are very large in comparison to antenna impedances and can be ignored in any practical measurement.

Warts and precautions

The processor used in this project does not provide either advanced arithmetic functions, or floating point arithmetic, meaning that all arithmetic has to be done from first principles and using integer numbers either between 0 and 255, or 0 and 65535. This causes "lumpy" calculations, which become less accurate as the measured impedance moves away from the 50 ohm calibration point, and as one set of calculated results is used to derive others (SWR is calculated from R and X). Despite these factors, the instrument offers accuracies of better than 10% with accuracy improving as 50 ohms is approached. The little beast is therefore not a laboratory instrument, but rather a design aid, like a dip meter.

On another tack, the presence of interfering signals should always be kept clearly in mind. In the author's location (with an underground mains supply) 30 metres of long wire antenna only produces a few millivolts peak of 50 Hz hum in the test circuit, which does not upset calculations. However, in locations near overhead high voltage lines, hum pickup may possibly become a problem, and can be dealt with either by placing an RF choke directly across the instrument terminals or a capacitor (0.1 µF) in series with the antenna under test. At the low frequency end (1.5- 6 MHz) a value of 1 mH is suggested, while 100 µH should be used for higher frequencies (watch out for unwanted resonances!). Of course, the balun necessary for measurements on balanced antenna systems will completely eliminate the 50Hz problem. Unfortunately, no such quick and dirty fix exists for RF interference. With this in mind (and in the interests of linear detection), the output from the RF signal generator was made as large as possible, consistent with reasonable battery life. You will have to be quite near a transmitter for it to seriously compete with the 1.5 volts peak applied to a 50 ohm load, but nonetheless, bear interference in mind at all times.

One other problem which should be firmly kept in mind is that aerials can attain very high voltages due to static charges from wind action. Always ground the antenna first before connecting the Aerial Analyser, to avoid damage to the instrument.

Acknowledgements

One of the tasks accomplished by the Greek hero Hercules, for which he was justifiably famous, was the cleaning out of the stables of King Augeias. Barry Williams VK5ZBQ, undertook a similar task when he waded through the authors initial circuits, component overlays and software to make a second prototype. While doing this, he eliminated a lot of very bad blunders and made suggestions which greatly improved the instrument. Thanks Barry.

ar

Unravelling the mysteries of connecting radios to antennas. Part 2

Transmission lines, filters, baluns and couplers

Brian Clarke, VK2GCE
brianclarke01@optusnet.com.au

Transmission lines

The main point from the previous section is that when we try to use a fairly simple antenna – a horizontal or vertical dipole or ground-plane configuration – over several amateur bands, Z_{AE} will vary quite considerably. It will be resistive at a few points and reactive at all others.

To progress the discussion, I will assume for now that we connect our transmission line (or feed-line) directly to the feed point of our antenna. We have a choice of transmission lines – balanced or unbalanced.

Balanced transmission lines

A pair of wires, of the same dimensions and covering, held apart so they don't arc at voltage nodes and twisted so that any capacitive effects of nearby conductors will affect each wire approximately equally, constitutes a parallel, open wire, balanced transmission line. A simplified equation for the characteristic impedance of this transmission line is given by:

$Z_0 = 276 (\log (2s / d)) / \sqrt{\varepsilon}$

where

ε = the dielectric coefficient of the insulating material between the wires

s = the spacing between the centres of the wires

d = the diameter of the wires

Using round wires held closely together in air (s = d, ε = 1), we could be forgiven for believing that Z_0 becomes 83 Ω. However, the formula above is an approximation, and as s approaches d, Z_0 actually approaches zero. If we insulate the wires, s increases a little and the impedance will rise. When s = 1.075d, Z_0 is very close to 50 Ω.

The practical problem is how to maintain that exact spacing. This can be done by sleeving one of the pair of wires and taking the dielectric coefficient ε of the sleeve material into account. The trouble is that most sleeving materials shift the impedance too high. To overcome this you could cut slots in the sleeve so that the effective dielectric coefficient is lower, but the results from this technique are very difficult to control.

If instead of round wires we use oblong cross-section wires, with the longer sides of the oblong parallel to form a flat strap, we can get a more controllable and lower characteristic impedance:

$Z_0 = 138 (\log (4s / w)) / \sqrt{\varepsilon}$

where

s = the spacing between the wires

w = the width of the wires

or if w >> s

$Z_0 = 377s / w\sqrt{\varepsilon}$

Using this arrangement, we can get a Z_0 as low as 25 Ω quite easily. But a transmission line of this construction is rather impractical for use in feeding a dipole located tens of metres in the air.

Another way of getting a lower Z_0 is by running two sets of parallel open wire feeders in parallel, although making the spacers to keep four wires evenly spaced is a nice afternoon's work. This form of transmission line is less likely to be unbalanced by stray capacitive effects to conductors nearby.

With greater spacing, practical characteristic impedances of 150 Ω to 1,000 Ω are quite achievable.

In air, the breakdown voltage is about 1 kV per mm; this may fall under high humidity. If we were to roll our own 600 Ω line from say 14 gauge wire, the spacing between the conductors would be about 125 mm. For a power level of 1 kW, and a perfect VSWR of 1:1, the voltage between the conductors, given by $V = \sqrt{(PR)}$, is 775 V. We could run to a VSWR of 161:1 before voltage flashover occurred, though the cable would have melted due to excess current before that.

Unbalanced transmission lines

If we use a pair of parallel conductors, one of which is always exposed to a variety of other conducting objects (eg, handrails, gutters, down-pipes, the earth and tower uprights), whilst the other is always kept a fixed distance from the first conductor but not exposed to any other conducting objects, we have a recipe for an unbalanced transmission line. A readily available form of this is the coaxial cable. A simplified formula for the characteristic impedance of this transmission line is given by:

$Z_0 = 138 (\log(D / d)) / \sqrt{\varepsilon}$

where

ε = the dielectric coefficient of the insulating material between the conductors

D = the inside diameter of the outer sheath conductor

d = the outside diameter of the inner wire

Practical values of Z_0 for air-insulated coaxial cables run between 50 and 150 Ω. When polyethylene or polytetrafluoroethylene (PTFE) is used as the insulator, the most readily available coaxial cables have Z_0 ranging from 50 to 95 Ω. Values outside these ranges are possible, but usually quite expensive. Rolling your own is not on.

If we want lower values of Z_0, we can run two coaxial cables in parallel, tying both inners together, and separately, both outers together, at both ends. But

the costs and losses will be doubled. It would be better to use an unbalanced-to-unbalanced transformer (unun) to transform the impedance.

At the power levels commonly used by radio amateurs, flashover is unlikely under normal (ie, VSWR = 1:1) conditions. Using the formula $V = \sqrt{(PR)}$, and inserting 400 W and 50 Ω, we get V = 141 V. If we were to use RG-58 cable which has a maximum operating voltage of 1,900 V, we could operate at a VSWR up to 13.5:1. However, the maximum current at the current nodes would be 38 A, which would likely melt the cable. The closer we operate to the maximum capability of any transmission line, the less room we have for high VSWR; eg, during tune-up or when accidents have occurred to our antenna.

Using second-hand coaxial cable is fraught with danger – unless you have specialised test equipment, you cannot tell whether:

- the cable is full of water, changing the dielectric coefficient
- the outer braid has been flexed to near breaking point
- the inner conductor has been very warm, softened the insulation and changed the internal dimensions and hence the impedance and/or flashover voltage

Matched transmission lines

We know from the Jacobi theorem that if the transceiver, transmission line and antenna impedances are the same, there will be no standing waves on the transmission line. That is, all forward power is absorbed by the antenna and none is reflected back to the transceiver. This means that arc-overs or instances of melting are unlikely, provided we don't exceed the cable manufacturers' ratings. It also means that the length of the transmission line is unimportant – true or false?

Not true: there are always losses in any transmission line – the main ones are ohmic losses in the resistance of the conductors, and dielectric losses. These losses are proportional to length and frequency. Figure 4, from the ARRL Antenna Handbook, shows some losses for typical transmission lines that radio amateurs might use.

These data are averages: some manufacturers' cables may be slightly different, and may vary between and within particular batches. Coaxial cables with foam dielectric generally exhibit lower dielectric losses than with solid dielectric.

You may wish to calculate the losses of your cable using the calculator at the url:
http://www.benelec.com.au/cables/cables.htm.

Enter frequency in MHz, click on the 'Calculate' button, and attenuation will be calculated for you.

Just as an example, say we choose RG-58 coaxial cable for operation in the 10 m band. The matched-line loss is about 2.6 dB per 100 feet; ie, around 45% of the input power is lost as heating over that length. If we change to RG-8 the loss over 100 feet is about 1.3 dB, or around 36 % heating loss. Compare this performance with that of open-wire feed-line where the loss over 100 feet is about 0.1 dB, or around 2.3 % – negligible.

Where do the losses go? They go into heating the cable. Over a long period of time, especially when operated

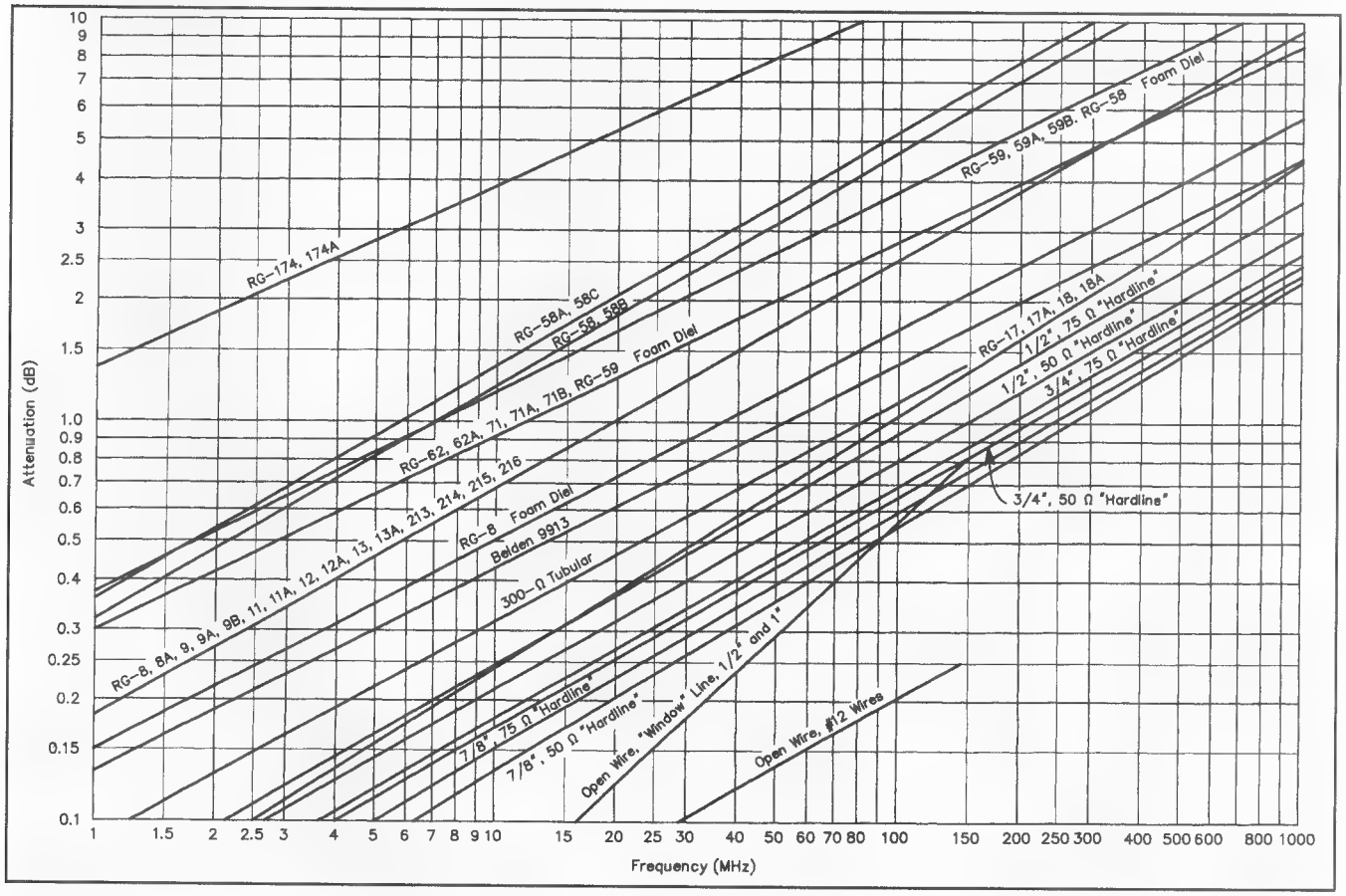
Attenuation (dB)
Frequency (MHz)
RG-174, 174A
RG-58A, 58C
RG-58, 58B
RG-62, 62A, 71, 71A, 71B, RG-59 Foam Diel
RG-8 Foam Diel
Belden 9913
300-Ω Tubular
RG-8, 8A, 9, 9A, 9B, 11, 11A, 12, 12A, 13, 13A, 213, 214, 215, 216
7/8", 75 Ω "Hardline"
7/8", 50 Ω "Hardline"
Open Wire, "Window" Line, 1/2" and 1"
Open Wire, #12 Wires
RG-59, 59A, 59B, RG-58 Foam Diel
RG-17, 17A, 18, 18A
1/2", 75 Ω "Hardline"
1/2", 50 Ω "Hardline"
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Fig 4. Loss in matched transmission lines vs frequency (Fig 26 from p24-18 of the ARRL Antenna Handbook 1991).

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near their upper power limits, the conductors in coaxial cables may wander, which would lead to changes in local characteristic impedance, a rise in VSWR and a lower flashover threshold. Over time, coaxial cables can degrade, especially when exposed to sun and rain/ice.

Unmatched transmission lines

Generally we should aim for a VSWR of about 1:1. This is achieved when the antenna feed point impedance matches the characteristic impedance of the transmission line; ie, $Z_{AE} = Z_0$. In all other cases, some of the transmitter power is reflected by the impedance mismatch and travels back down the transmission line. This reflected power interacts with the forward power to create standing waves of voltage and current along the line.

The VSWR is the usual measure of the magnitude of the reflected power and therefore is also a measure of the inefficiency of the transmission system. VSWR ranges upwards from 1:1 for zero reflected power, to 1.5:1 for 4 % reflected power, to 2:1 for 11 % reflected, etc.

When the VSWR exceeds 1:1, we experience losses in addition to those described in the previous section, and the higher the VSWR, the higher these extra losses. High VSWR also increases the risk of transmission line damage through flash-overs or over-heating. Where does the increased power loss go? As before, into heating the cable and its environment.

If you are interested in finding out the increased loss you are likely to experience when the transmission line is not matched, have a look at "Unmatched Line Loss" in the *ARRL Antenna Handbook* (1991) p. 24-13.

In summary, we can see that coaxial cables are more lossy than open wire feeders, cost more to purchase, are very difficult to inspect for damage and can withstand much lower VSWR. The main advantage of coaxial cable is that it is easy to install – even if incorrectly.

How should we connect our transceiver to an antenna?

Let's have a look at each of the system components:

- Low pass filter (LPF),
- Balun/unun,
- Antenna coupling unit (ACU), and
- Transmission line (TL).

The low pass filter (LPF)

All transceivers have non-linearities. The manufacturers of transceivers often quote a figure of merit claiming how low (in dB below the carrier) any spurious emissions will be. If our antenna is resonant, its response follows the usual Q curve of any LC device, so frequencies away from resonance will be attenuated. However, the antennas we are considering exhibit multiple resonances corresponding to multiples of $\lambda/4$. If our antenna is non-resonant, or worse, resonant at spurious frequencies, then those unwanted signals would be radiated and received.

Most LPFs are symmetrical. This means that they reduce harmonics getting out of the transceiver and spurious antenna resonances getting back in.

LPFs work best at constant Z; ie, when the input and output impedances are the same.

Therefore, the best place for the LPF is just after your transceiver and before your ACU.

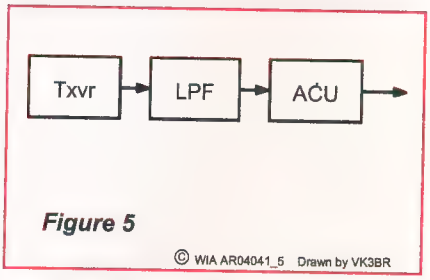

Figure 5

© WIA AR04041_5 Drawn by VK3BR

Fig 5. Where to place the LPF.

A few words of warning about LPFs

If you operate an LPF in a position where the VSWR is high, components inside the LPF could easily be damaged. For instance, in an LPF designed for 500 W on a 50 Ω line, the input and output capacitors would be chosen to withstand 158 VRMS, or 224 V peak, plus a safety factor of at least 15 %. Say the manufacturer's accountant has permitted the use of 300 V capacitors; what is the maximum VSWR you can safely tolerate when using the amateur's legal limit of 400 W?

400 W produces 141 VRMS in a 50 Ω line and this corresponds to a peak of 200 V. The 300 V limit is reached at a VSWR of 300 / 200 = 1.5:1. If you tune

up at say 100 W, the maximum VSWR sustainable is 300 / 100 = 3:1. If you want to keep your LPF without having to repair it, tune up at much reduced power and do the final tuning, at full power, only when the VSWR is safely below 1.5:1.

Knowing this limitation, you may decide to increase the voltage rating of the capacitors in your LPF. This would allow you to operate at a higher VSWR, but now the current-carrying capacity of the inductors may be exceeded. If the inductors are wound on ferrite cores, operating beyond the design current may cause core saturation and create non-linearity in the inductors; and this will generate harmonics in the transmitted signal.

If you damage the capacitors in the LPF, there may be no visible or sniffable sign and you may keep operating – but now, the final inductor in the LPF is part of the transmission line and will make the adjustment of any antenna coupler very difficult.

Next problem – how far can we wander from the frequency on which we have tuned up before we exceed a VSWR of 1.5:1? That depends on the impedance spiral of your antenna-plus-transmission-line (see Figure 2 in Part 1 of this article) and whether you have an automatic antenna coupler.

If you have a transceiver with a built-in automatic antenna coupler, putting an LPF in the output line from the transceiver exposes the LPF to considerable stress, particularly if the automatic coupler does its 'tuning' at full power. It is claimed that some built-in antenna couplers will suppress harmonics, so you would think you could operate without an external LPF. But usually the coupler is only in circuit when transmitting, so you forgo the protection from spurious antenna signals when receiving.

The Balun/Unun

Why would we want a balun or unun? The main reasons are:

- To provide impedance transformation – both the unun and balun can do this;
- To provide a balanced input to an antenna when all we have from a transceiver is an unbalanced output – only a balun does this;
- To prevent unbalanced currents from flowing in our transmission line – again, only a balun does this.

On this last point, see the article by Lloyd Butler VK5BR on unbalanced feed in *Amateur Radio* magazine, May 2004.

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If the core gets sufficiently hot, it loses its permeability, so the inductance falls. Another major effect of core saturation is waveform distortion, which means the generation of harmonics.

If you connect the unun or balun after the ACU, you may be asking it to handle a wider range of voltage and current than those for which it was designed. If you run it in a reactive circuit, even though the power level may be correct, the voltage or current could be much higher than expected (see Figure 1 in Part 1 of this article) and exceed the design limits.

So, we need to run an unun or balun within the frequency, impedance and power ranges for which it was designed.

If you have a resonant antenna and therefore choose not to use an ACU, you may be able to use a unun or balun fitted at the antenna's feed point. This is fine. However, as discussed earlier, the losses in coaxial cable are a good deal greater than in an open wire line. So you may face a problem if your transceiver is designed only to feed coaxial cable. In this case use a very short length of cable, say to a balun on the outside of your radio shack, and then use open wire TL from there to the antenna feed point.

A multi-frequency example

Suppose you have an antenna whose feed point is elevated to 29 m because you want it to be at 0.18λ above ground for operation on 160 m, giving you a 50 Ω feed point impedance. You use a simple 1:1 balun at the antenna feed point, fed by 100 feet of RG-58 cable as your TL. Say you had a VSWR meter just after the LPF; on 160 m, the VSWR meter should read very close to 1:1, as you'd expect.

Now consider operation at the lower end of the 10 m band. The first effect is that the feed point impedance is likely to be closer to 72 Ω, but slightly reactive because it is a bit over an odd number of quarter wavelengths long. Now, recall the earlier example where we used 100 feet of RG-58 to feed our multi-frequency antenna. The second effect is that the cable losses will be much higher on 10 m than on 160 m. Because of these losses, the VSWR meter will read less than 1.4:1, and you will think that all is OK.

Next, say you decide to operate a bit higher in the 10m band; eg, 28.8 MHz. The antenna is now an even number of quarter wavelengths long and the impedance becomes very high. But, because of the losses in the coaxial TL, your VSWR meter will give a more optimistic VSWR reading than is actually the case. And the balun will be very unhappy indeed.

What to do? The best solution is to use an open wire TL from the antenna feed point down to an ACU that has a balanced output. Alternatively, fit an automatic or remotely controlled ACU (with balanced output) at the antenna feed point and run RG-58, RG-8, RG-213, Belden 9913 or ½" hard-line from the LPF to the ACU. These alternative cables are listed in order of increasing cost and decreasing loss.

Another HF example

Perhaps 160 m is not feasible for those of us on 1/5 acre blocks. Many local authorities allow a tower or mast that doesn't exceed 10 m height. This is pretty good for a 40 m horizontal dipole. Let's assume you can connect a balun at the centre feed point and choose to use RG-58 as your TL. So, if we install a 1.5:1 balun designed to operate at 50 Ω on the TL side and 75 Ω on the antenna side, the antenna will work well on 40 m.

What happens when we try to operate on the other amateur bands? Now, there may be only 15 m of TL from the transceiver or ACU up to the antenna, so the losses, even in the 6 m band, will be less than 0.5 dB. Such an antenna will present a very high input impedance on 20 m and 10 m, perhaps as high as 5 kΩ; and neither the balun nor the TL will be very happy, even if an ACU is used just after the LPF. This is what we must expect when operating on the even harmonics.

What to do? Once again, the best solution is to use an open wire TL from the antenna feed point down to an ACU that has a balanced output. Alternately, fit an automatic or remotely controlled ACU (with balanced output) at the antenna feed point and run unbalanced coaxial cable from the ACU down to the LPF.

What about working on the odd harmonics, ie, 30 m, 15 m and possibly 6 m? For 30 m, the antenna length is very nearly resonant, but the height is now 0.33λ and so the antenna impedance is around 96 Ω. For 15 m, antenna length is about right but the height is 0.66λ and so the antenna impedance is around 60 Ω. For 6 m, antenna length is about right but the height is 1.66λ and so the antenna impedance is around 70 Ω. In all these cases, the balun is not being presented with the correct antenna impedance and so the TL will have standing waves on it. But the maximum VSWR is likely to be 1.3:1, which the RG-58 can handle. Your transceiver may even accept that degree of mismatch and then an ACU would not be required.

The best place for a balun or unun is where there are constant impedances each side. This is likely to be before the antenna coupling unit, or directly into a single frequency, resonant antenna (see Figure 6).

The antenna coupling unit (ACU)

To minimise the losses in your system, particularly desirable if you are operating on very low power, the best place for

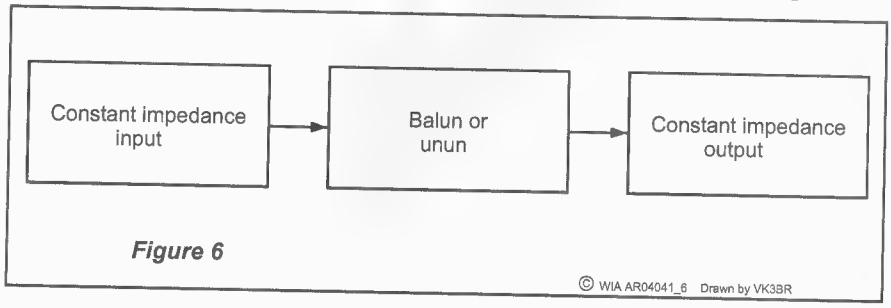

Fig 6 – Placement of balun/unun.

the ACU is as close to the antenna feed point as possible. (Some might say the best place is way outside the system.) However, we are trying to operate on as many frequencies as possible; so some form of ACU is necessary.

The ACU performs two major functions:

- it provides a conjugate impedance; and
- it transforms the impedance between the input and output.

What is 'a conjugate impedance'? Say your antenna presents a feed point impedance of 150 + j65 Ω. The ACU can be adjusted to provide –j65 Ω to cancel out the inductive +j65 Ω component. What now remains is 150 Ω; ie, a resistive load. The ACU can now be further adjusted to provide a 3:1 impedance transformation, so that the input can be fed with 50 Ω coaxial cable. In practice, both adjustments are done incrementally.

Most ACUs are so large and heavy that they would not be suitable for attachment to the centre of an antenna strung between two end supports. However, if the feed point is on a support, this is a good place for the ACU. Only remote-controlled or self-contained, fully automatic ACUs can be used in this fashion. If your ACU requires you to operate the controls manually, then it will need to be at the station or operating end of the TL.

If you are using an ACU at the antenna feed point and choose to measure VSWR at the bottom of the TL, coaxial feed line losses may present a problem. Your fully automatic ACU will have its own in-built VSWR sensing, so a measurement of VSWR at the lower end of the TL, in this case, can only be of academic value. Record these measurements anyway, as they could have diagnostic value if your automatic ACU, or the power supply to it, fails. When using a remote-controlled ACU, measuring the VSWR at the input end of the TL may not give optimum ACU settings because losses in the TL will cause optimistic VSWR readings.

There are several types of ACU designs available, either as store-bought or roll-your-own. Roll-your-own designs are to be found in most antenna books. The choices are:

- input – balanced or unbalanced
- output – balanced or unbalanced
- the range of compensation and transformation.

The advantage of a **balanced input** is that losses in the TL feeding the ACU are minimised. Balanced input is slightly more complex than unbalanced, and you are less likely to find a store-bought one sporting this.

The advantage of the **unbalanced input** is that relatively simple components can be used for the roll-your-own variety.

The advantage of a **balanced output** is direct connection to the antenna feed point, or connection to a low loss, open wire, balanced feed line. As with the input, balanced output is slightly more complex than unbalanced, but there is an even chance of finding a store-bought one.

The advantages of the **unbalanced output** are that

- it can be used with inherently unbalanced antennas, such as the quarter-wave ground-plane; and
- relatively simple components can be used for the roll-your-own variety.

A good ACU can compensate for a wide range of resistive and reactive impedances presented to its output: say 30 Ω to 5 kΩ resistive and 0 Ω to +/–5 kΩ reactive. With an unbalanced input and output, we don't need an unun; with an unbalanced input and a balanced output, we don't need a balun.

The transmission line (TL)

If the ACU has unbalanced input and balanced output, an unbalanced TL runs from the LPF to the input of the ACU, and the balanced output is connected to the antenna feed point via a section of balanced TL. This is the usual configuration when a manually operated ACU is used. See Figure 7a below. Consequently, as the unbalanced TL is fairly short, even if the balanced TL is quite long, the system losses are small.

If the ACU is an automatic or remotely controlled one, and is connected right at the antenna feed point, the main TL runs between the LPF and the input of the ACU; only a very short TL runs from the ACU to the antenna.

If the ACU is balanced at input and output, and the antenna is balanced, a balun is required at the output of the LPF (if it is unbalanced, as most are) and the main balanced TL runs from the balun to the ACU. See Figure 7b.

If the ACU is unbalanced to balanced and the antenna is balanced, no balun or unun is required but the losses on the unbalanced TL (coaxial cable) will be higher than in the previous example. See Figure 7c.

If the ACU is unbalanced to unbalanced and the antenna is balanced, then a balun is required between the ACU output and the antenna feed point, typically with a very short piece of TL each side of the balun. However, this is not a desirable architecture because the impedances on either side of the balun will change with each operating frequency.

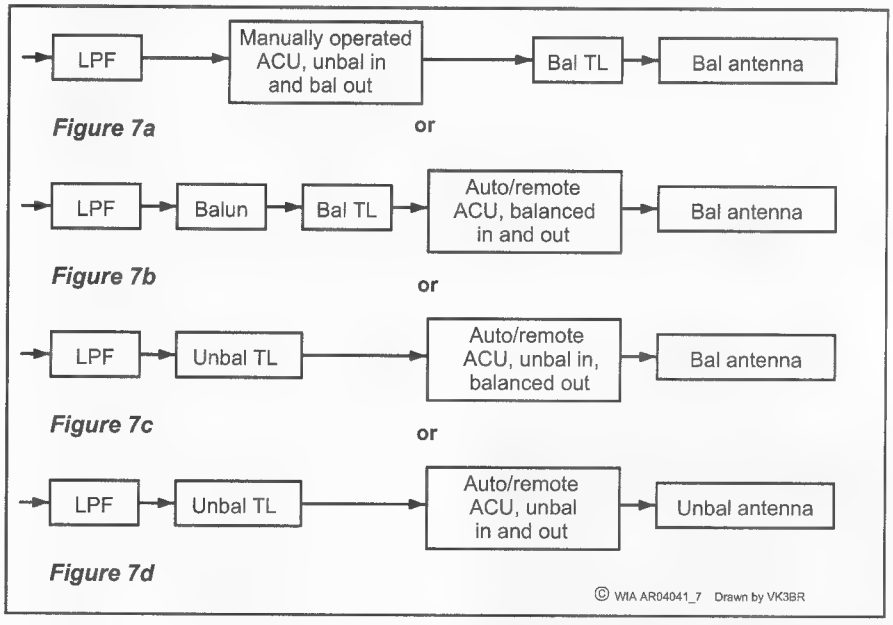

Figure 7 – Where to place the ACU: (a) Manual ACU; (b) Balanced feeder and balanced antenna; (c) Unbalanced feeder and balanced antenna; (d) Unbalanced feeder and unbalanced antenna.

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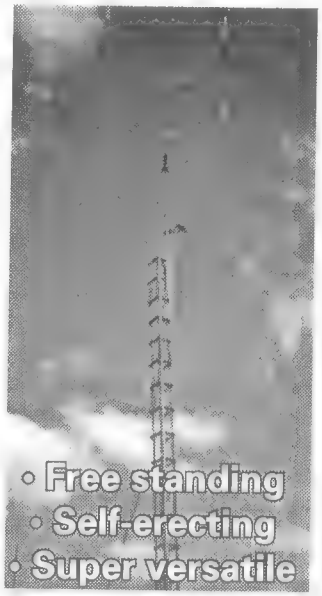

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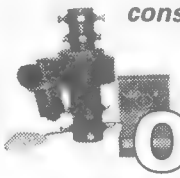

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Figure 7d shows the system arrangements for feeding a vertical dipole (unbalanced antenna) in a fixed or mobile application.

In general, the TL suffers less power loss if it is operated at its characteristic impedance; ie, with a VSWR of 1:1. As discussed earlier, a high VSWR causes:

- increased losses on the TL, and
- undesirably high voltages and currents,

both of which can shorten the life of your TL.

If there is a likelihood of operating the TL at other than its characteristic impedance, consider using an open wire feed line, where the losses due to high VSWR, and the likelihood of flashover or meltdown, are significantly less.

Bearing in mind the experimental work by Lloyd Butler VK5BR (*AR*, May 2004), it is better to feed balanced to balanced and unbalanced to unbalanced. Any mixing, for example, unbalanced to balanced, can result in:

- unbalanced currents on the TL,
- possible interference complaints from neighbours,
- tingly sensations when operating the PTT, and
- an unpredictable radiation pattern for your antenna.

Home-brewed open wire feed lines are much cheaper than coaxial cable. The only drawbacks with open wire feed lines are that they may need more maintenance, especially in high wind areas.

Summary of Part 2

1. Using two-wire TLs, Z_0 from 83 Ω up to 1 kΩ can be achieved. Lower values of Z_0 can be achieved by using stripline or four-wire TL techniques.
2. Unbalanced TLs, ie, coaxial cables, cannot be home-made. And only a few values of Z_0 between 50 Ω and 150 Ω are available.
3. Using second-hand coaxial cable is risky. It is quite difficult to discover damage to coaxial cables without good test gear.
4. For the impedances and power levels used by radio amateurs, VSWR-generated flashover is far less likely than meltdown. Heating of the conductors in a coaxial cable may permanently alter their spacing, affecting the Z_0 and local VSWR.
5. All TLs have losses. Coaxial cables have higher losses than open wire balanced TLs. Unmatched TLs have even higher losses. Open wire TLs are usually the better way to go.
6. Where should the various components of the antenna feed system go?
   - The LPF always follows the transceiver, unless it has its own built-in ACU – in which case, omit the LPF. If the transceiver has its own ACU, feeding its output into a (fixed impedance) unbalanced TL is unwise.
   - Match the type of TL to the type of feed; ie, balanced to balanced and unbalanced to unbalanced.
   - Use a balun to convert the transmission components from balanced to unbalanced, or vice versa. Always use baluns at constant impedance. Often the ACU contains a balun.
   - Try to get the ACU as close to the antenna as possible, matching the type of ACU to its input and output feeds.

References and bibliography

Sources used in Part 2 are:

- *ARRL Antenna handbook* (1991) though any recent edition should do
- *ARRL Handbook* – any recent edition should do
- Butler, Lloyd 'The EH antenna' *Amateur Radio*, May 2004, pp.18 - 22
- Kraus, John D. *Antennas*, McGraw Hill, NY, NY. (1988)
- *Radio Communication Handbook*, RSGB, Potters Bar, Herts, UK (1982) ch. 11 Propagation
- Shrader, Robert L. *Electronic Communication*, (5th edition 1985), McGraw Hill, NY, NY. ch. 20

Part 3 of this article will appear in Amateur Radio, June issue

Round cable suppression cores

Ron Sanders VK2WB

The Autek Vector Analyzer VA1 is a small portable test instrument which combines a signal generator (0.5 – 30MHz) with the ability to measure SWR, Z, phase angle using source impedances from 25 – 450 ohms. Many other parameters are computed from the basic measurement and all readings are displayed on a 4 digit LCD meter.

With the VA1 it is possible to measure the effects of various types of suppression cores and so get an actual measurement of the impedance at any frequency from 0.5 – 30MHz. Since the cores are basically suited to 6.35mm and 12.7mm diameter cable it was decided to use the screen of RG-58 and RG-213 coax cable for the test section.

Test setup

Fig. 1 shows the test setup using a 32cm length of coax and up to 6 cores. By measuring the impedance of the screen itself at various frequencies and then adding cores, we can see the effect on the impedance measurement. The cores are centered on the coax for each measurement. The VA1 impedance was set at 50 ohms for all the tests.

Note that the impedance values for any single type of core can vary by +/- 20%, so the results should be used as a guide only

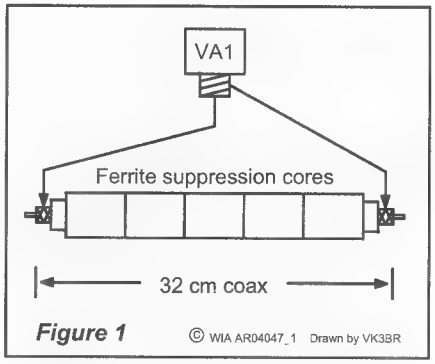

Figure 1 © WIA AR04047_1 Drawn by VK3BR

Fig. 2 shows how the attenuation is calculated from the results.

The common mode impedance (Zl) of the screen of the 32cm length of cable (NOT the characteristic impedance) is dependent on the frequency and is shown in the following tables alongside the frequency. Zg is always 50 ohms – the VA1 impedance. Zb is the factor due to the addition of suppression cores. The added impedance effect of the connecting leads (total 32cm) is deducted from the value of Zl. The tables show the corrected Zb values that relate to the coax only.

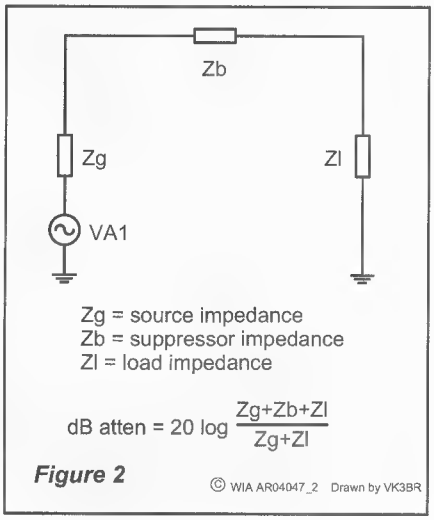

Figure 2 © WIA AR04047_2 Drawn by VK3BR

1. Results using RG-58 coax

Correction table for RG-58 coax by eliminating effect of connecting leads

Frequency	Leads + RG-58	Leads only	RG-58 only
MHz	Z Ω	Z Ω	Zl Ω
1.8	5	3	2
3.55	15	10	5
14.2	55	30	25
28.5	100	55	45

1.1 FB-43-5621 cores

Freq	No core	+1 core	+2 core	+3 core	+4 core	+5 core	+6 core
MHz	Zl Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω
1.8	2	40	65	95	115	135	175
3.55	5	65	115	160	205	250	315
14.2	25	150	295	395	490	590	700
28.5	45	175	265	290	310	325	345

1.2 FB-31-5621 cores

Freq	No core	+1 core	+2 core	+3 core	+4 core	+5 core	+6 core
MHz	Zl Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω
1.8	2	55	100	140	185	230	280
3.55	5	85	155	230	310	390	475
14.2	25	155	275	415	495	565	745
28.5	45	180	295	300	310	345	390

1.3 2X-43-251P2

Freq	No core	+1 core	+2 core	+3 core	+4 core	+5 core	+6 core
MHz	Zl Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω
1.8	2	25	65	85	115	135	160
3.55	5	50	115	150	205	240	295
14.2	25	125	260	375	495	540	640
28.5	45	200	295	305	325	370	395

1.4 2X-31-281S2

Freq	No core	+1 core	+2 core	+3 core	+4 core	+5 core	+6 core
MHz	Zl Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω	Zb Ω
1.8	2	50	90	120	150	160	185
3.55	5	80	145	195	160	270	320
14.2	25	155	285	435	475	490	635
28.5	45	180	270	280	320	350	365

1.5 Analysis

In table 1.3 at 14.2MHz Zl is 25Ω and in column 6 (4 cores), Zb = 495Ω.

Therefore:

Attenuation = 20 log ((50 + 495 + 25)/(50 + 25)) = 17.6dB
And from the same table at 3.55MHz
Attenuation = 20 log ((50 + 205 + 5)/(50 + 5)) = 13.7dB
At 28.5MHz the attenuation drops to 12.9dB

Note that the results in tables 1.2 and 1.4 provide better attenuation (increased Zb) at 1.8MHz. This is due to the use of 31 ferrite material rather than 43 material.

2 Results using RG-213 coax

Correction table for RG-213 coax by eliminating effect of connecting leads

Frequency MHz	Leads + RG-213 Z Ω	Leads only Z Ω	RG-213 only Zl Ω
1.8	5	3	2
3.55	15	10	5
14.2	45	30	15
28.5	85	55	30

2.1 2X-43-151P2

Freq MHz	No core Zl Ω	+1 core Zb Ω	+2 core Zb Ω	+3 core Zb Ω	+4 core Zb Ω	+5 core Zb Ω	+6 core Zb Ω
1.8	2	10	30	50	80	95	120
3.55	5	25	60	95	145	175	220
14.2	15	90	185	325	395	530	595
28.5	30	170	220	290	305	340	370

2.2 2X-31-181S2

Freq MHz	No core Zl Ω	+1 core Zb Ω	+2 core Zb Ω	+3 core Zb Ω	+4 core Zb Ω	+5 core Zb Ω	+6 core Zb Ω
1.8	2	10	15	40	45	70	80
3.55	5	20	25	70	80	120	140
14.2	15	70	90	190	230	325	365
28.5	30	150	195	280	295	315	320

2.3 FB-43-1020

Freq MHz	No core Zl Ω	+1 core Zb Ω	+2 core Zb Ω	+3 core Zb Ω	+4 core Zb Ω	+5 core Zb Ω	+6 core Zb Ω
1.8	2	45	80	115	150	180	215
3.55	5	70	130	190	255	320	385
14.2	15	155	285	415	455	580	765
28.5	30	160	245	270	285	325	345

2.4 FB-77-1024

Freq MHz	No core Zl Ω	+1 core Zb Ω	+2 core Zb Ω	+3 core Zb Ω	+4 core Zb Ω	+5 core Zb Ω	+6 core Zb Ω
1.8	2	60	120	175	235	290	350
3.55	5	30	75	110	155	190	230
14.2	15	30	50	70	95	110	130
28.5	30	50	45	55	65	80	95

2.5 Analysis

In table 2.3 at 14.2MHz the cable only Z is 15Ω and in column 6, Z = 455Ω.

Therefore:
Attenuation = 20 log ((50 + 455 +15)/(50 + 15)) = 18.1dB
And from the same table at 3.55MHz
Attenuation = 20 log ((50 + 255 + 5)/(50 + 5)) = 15.0dB
At 28.5MHz the attenuation drops to 13.2dB

2.6 Making practical use of the data

The results show the effect of different ferrite materials and core sizes over the range of 1.8 – 30MHz. These figures are useful for making informed decisions on particular suppression requirements depending upon the frequency and cable diameter. The results can be applied to common mode suppression for a bundle of wires that fit the core. I don't know why the measured impedance at 28.5MHz falls below that at 14.2MHz after more than 2 or 3 cores are fitted, but that is the way it worked out.

All the results above are related to a source impedance (Zg) of 50Ω. If the Rg was 25Ω the attenuation is significantly improved. In section 2.5 the attenuation at 14.2MHz produced 18.1dB, but with Zg = 25Ω the attenuation would increase to 21.9dB. You can see that a low source impedance produces the best attenuation with a given suppression core setup. Unfortunately it is not always easy to determine the source impedance of the unwanted RF. It is common practice to fit a bypass capacitor to all non-signal leads leaving a piece of RF equipment. This is done to reduce the "source impedance" (Zg) of any internally induced RF on the leads so that any external suppression cores are more effective.

3. Core types

Note: All core types described here are manufactured by Amidon.

The following cores are only suitable for fitting to un-terminated cables:

FB-43-5621, FB-31-5621 are sleeves with an inside diameter of 6.35mm and will fit over RG-58 and RG-59 coax.

FB-43-1020, FB-77-1024 are sleeves with an inside diameter of 12.7mm and will fit over RG-213 coax.

The following cores are useful for fitting to cables that are already terminated with connectors:

2X-43-251P2 and 2X-31-281S2 are split cores with inside diameter of 6.35mm and include a nylon snap fit case to clamp around the cable.

2X-43-151P2 and 2X-31-181S2 are split cores with inside diameter of 12.7mm and include a nylon snap fit case to clamp around the cable.

The table below lists the recommended suppression range for each material.

Material	Recommended suppression range - MHz
31	< 500
43	20 – 250
77	< 2

Conclusions

The tests carried out on coax cable can be applied to any cable where suppression of unwanted RF is required. Suppression cores may need to be fitted at one end or both ends of a cable. In cases where the cable length may be resonant it could be necessary to fit extra suppression along the cable. Recently I was made aware of the need for suppression cores on guy wires of a mast due to the very strong induced RF current caused by an FM broadcast station located nearby. There was sufficient current to noticeably heat the suppression cores.

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The North Queensland Amateur Radio Convention
16th, 17th and 18th September 2005
James Cooke University, Douglas Campus.
Contact: **Towsville Amateur Radio Club Inc**
PO Box 333, Garbutt East, Qld 4814
Phone 07 4779 7869 e-mail vk4wit@wia.org.au

"Paddyboard" circuit construction ~ *revised*

Drew Diamond VK3XU,
45 Gatters Rd.
Wonga Park, 3115.

Printed-circuit boards are routinely used for the cost-effective manufacture of consumer-electronics items - in their thousands. Their ubiquity may cause many of us to think that printed boards are the only way to build radio and electronics devices. Consider this: when we see an interesting circuit in a magazine, or wish to try a circuit of our own, it is usual for us to make just one. Serial number:- 1. Furthermore, our efforts do not have to pass inspection by the QA department, do not have to be automatically loaded by machine and wave-soldered - do not even have to look pretty. We simply want to get it working - pronto - without wasting precious hobby time in unnecessary effort.

A circuit board construction technique that is becoming increasingly popular with amateur radio constructors and experimenters uses appropriately sized pads of plain circuit-board material. No drilling or etching is necessary. Reliable operation- even for VHF circuitry is more readily obtained because the copper foil provides a continuous "ground-plane" beneath the components, and lead lengths can therefore be made very short, thus aiding circuit stability. Capacitance is about 4 pF per square cm for 2 mm fibreglass board. So, for dc, AF, HF and VHF work, the additional capacitance should not significantly alter circuit operation.

The example shown in Photo 1 is part of a three-band direct conversion receiver. Note how all components are fully accessible, even though the circuit board is fully installed in the receiver. Hence, any troubleshooting, experimenting, or later additions can be easily done with the board in-situ. And with a bit of practice, it can be made to look quite presentable too.

Scraps of single or double-sided board are hacksawed, guillotined, or tin-snipped to the size(s) required. Some examples are pictured in Photo 2. For applications involving ordinary transistors and passive components, squares of about 6 ~ 8 mm are suggested. Rough edges and burrs may be removed with a flat mill-file. According to authoritative opinion the dust from fibreglass board is not known to be hazardous. However, as with any

Photo 1 – Paddyboard construction.

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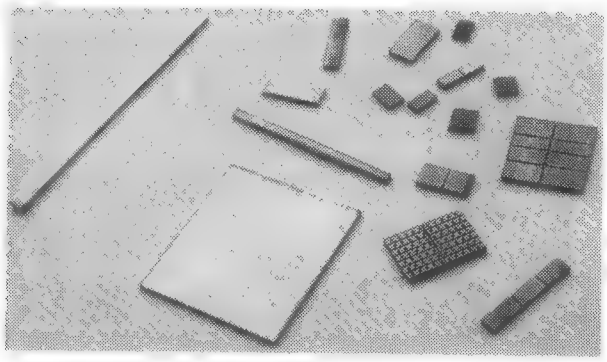


Photo 2 – Pads, strips and substrates.

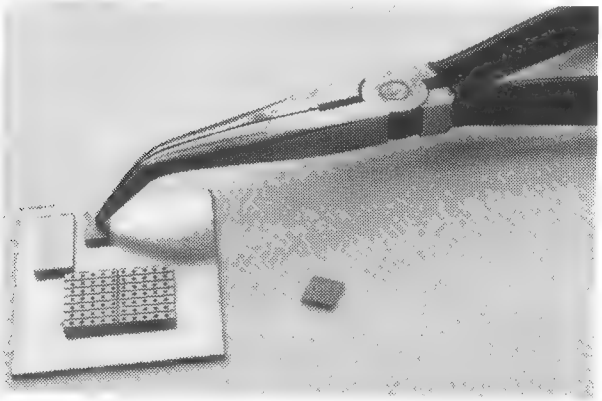


Photo 3 – Bent long-nose pliers as a "holder-downer".

dusty job: you should use a suitable mask (available from hardware shops) when cutting this material.

Pads, strips and substrates may be attached to the main circuit board with super-glue. Some grocers sell the Magic brand, which is dispensed from a small bottle, and applied with a tiny brush- much easier than a tube. The bottle may be re-filled from the cheaper tubes.

Both surfaces must be clean before the glue is put on. A tiny drop is applied to one side (fibre side for single-sided), and then the pad is quickly placed onto the board at the spot required. Photo 3 shows bent long-nose pliers in use as a "holder-downer" for the few seconds needed. Be sure the glue has set properly before the soldering iron is applied. If a pad needs to be removed later, carefully present a sharp pocket knife blade to the pad-board interface then snap it off the board.

For multi-leaded devices and components, we may use a "substrate" pad-board, sized accordingly. "Islands" or segments are formed by shallow cuts, whereby just sufficient copper is removed to create the individual islands. That shown on the right-hand side of Photo 2 will accommodate an 8-pin wire-wrap I.C. socket. Our substrate boards may be fabricated with the aid of a modeller's mitre box set (Photo 4)- available from model shops, complete with "back-saw" (so named, because it cuts on the back stroke). A "junior" hacksaw may also serve. The entire kit is shown in Photo 5.

When planning a circuit board from scratch, study the circuit, and then obtain those major components whose size and number will largely determine the board's size. To accommodate I.C.s, good results are obtained by using substrates made from suitably sized pieces of "Vero" board (visible in Photos 2 and 3), with a division cut along their length to separate the pins each side of the chip. An ordinary I.C. socket may then be soldered into the Vero, copper side up. Take care that the pins do not poke right through (and risk shorting to the board foil beneath).

For boards that will accommodate a largish number of components, supply rails (e.g. 6 and 12 Vdc) may be provided by strips of board made to run alongside the chief components, as illustrated in Photo 1, where the 12 V rail strip may be seen positioned along the lower edge of the board.

Having made all the necessary principal substrates, it is then possible to estimate the size needed for the main board. Draw the (estimated) area of the board first on paper. Place your substrates, pads, and strips upon the paper, then move the pieces around- chess fashion- to check that they will fit comfortably in the area available, and then record their position. A piece of circuit board material may then be cut to the required size.

Transfer the pads (no glue yet) onto the main board and replicate the layout. Now carefully lift each piece and super-glue it onto the board, as described above.

With the main pads and substrates in place, it is now possible to begin soldering the various components to their respective pads. Start with passives - resistors and capacitors, then discrete transistors, FETs and so on. I.C.s may be inserted in their sockets last. Small hook-up wire (or single-strand wire-wrap, or telephone wire) may be used for short links between pads as needed.

Leadless surface-mount components may simply be placed across cuts on a substrate board, or between pad(s) and main circuit-board foil.

Acknowledgments

The first known published circuit using pad-board construction is thought (by this writer) to be contained in an article in which a wideband solid-state amplifier is described by J Koehler,

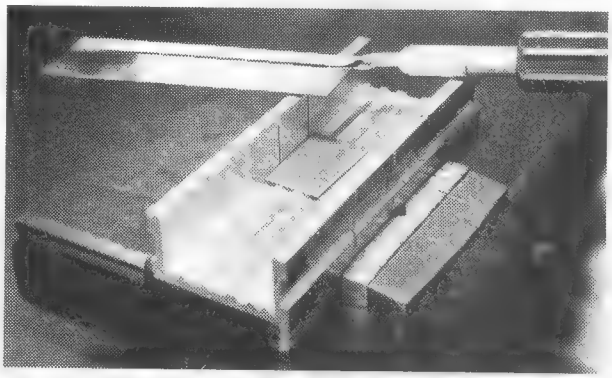


Photo 4 – Mitre-box and hacksaw.

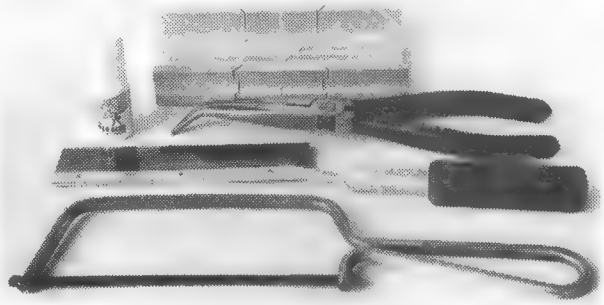


Photo 5 – Complete kit.

Herbert (Herb) Newman Stevens VK3JO

It is with great sadness we record the passing of Herb Stevens VK3JO who passed away on Sunday, 9th January 2005. He was an Honorary Life Member of the Wireless Institute of Australia and an elder statesman of our hobby.

His first amateur licence was dated 29.9.33 when Herb was aged 23 years. He was regularly active on the amateur bands, in particular 160 m and 2 m.

Herb's interest in radio goes back to 1923 when, at the age of 13, he built his first crystal set receiver from an article in Pals magazine. This was on the dawn of radio broadcasting in Australia.

The mysteries of wireless for the teenager included tuning into the Morse code transmissions from Melbourne Radio and ships at sea. In constructing his equipment Herb was assisted by his brother Bob VK3OJ, who predeceased him.

Herb saved up and purchased his first radio valve and built a receiver to expand his interest. He was able to listen to radio amateur pioneers such as Max Howden VK3BQ and Howard Kingsley-Love VK3BM (both now deceased) as they and others were pushing the new frontier in global communications on the short-wave frequency bands.

The WIA Victoria office-bearer list of 1938 recorded Herb as a councillor and member of the Magazine Committee with the responsibility for distribution. He was also involved in the Short Wave and Technical Development sections of the Institute.

In an ambitious activity, Herb VK3JO and others operated a 24 hour continuous test on the five metre band on 22-23 May 1938 from the WIA Victoria rooms in Queens Street, Melbourne. Herb operated his own home-built transmitter. H-Array antennas were aimed at Europe and the United States, however there were no DX contacts. His activity on that band also included field day operation in the You Yang Ranges.

Just prior to World War II he upgraded his amateur station equipment significantly, but it had to be delivered to the post office because possession of amateur transmitting equipment was prohibited during the war years.

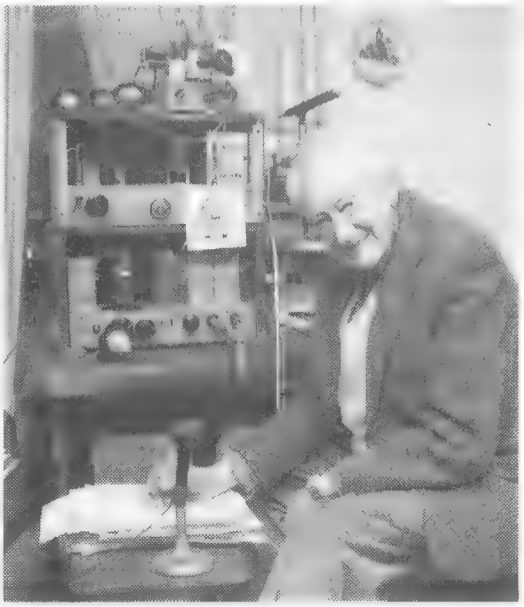
His involvement with the Wireless Institute of Australia, Victoria Division, was notable in that he was the President 1941-45 and kept the WIA journal Amateur Radio magazine going during the war years.

Herb's trade of plumbing was considered an essential service so he was not required to take up military service.

Post-war saw his continued involvement on the WIA Victoria Council, and he was Chairman of the VHF Group.

Herb was awarded Honorary Life Membership in recognition of his contributions to the hobby. He was also a life member of the Radio Amateur Old Timers Club where he was a regular and active participant.

Herb Stevens VK3JO was a quietly spoken gentleman, always willing to share his knowledge, and held many long friendships in the amateur radio fraternity among old timers and newcomers alike. He provided a valuable link with the pre-war era.



He will be sadly missed.

Vale Herb Stevens VK3JO

Based on an item from the Amateur Radio Victoria web page

"Paddyboard" circuit construction ~ revised *continued*

VE5FP (Reference 1). The technique was introduced here in an essay by Harold Hepburn, VK3AFQ (SK) where he outlined a similar amplifier (Reference 2). Basil Dale, VK2AW was also instrumental in sharing this bright idea with the QRP fraternity. Roy Hartkopf, VK3AOH (SK) coined the apt nickname; "Paddyboard" (our American colleagues call it "Manhattan"- presumably because it resembles a city street grid layout).

References and related articles:

1. "Four-watt Wideband Linear Amplifier"; J Koehler, VE5FP, Ham Radio (USA), Jan '76, pp42 - 44.
2. "Solid-State Power"; H Hepburn, VK3AFQ, ARA No's 12 and 13.
3. "Build It Yourself From QST"; Hale, QST April - July '92 (excellent series).
4. "How to Lay Out RF Circuits" I. White, G3SEK, RadCom Feb/Mar. '91.
5. "Manhattan-Style Building Techniques"; C Adams, K7QO, Homebrewer #1 (journal of the American QRP Club- www.amqrp.org), Summer, 2003, pp 20 ~ 23.
6. ""Paddyboard" Circuit Construction"; Diamond, Amateur Radio, Feb. '95.
7. "Try Building Your Own Equipment"; G Diana, N2JGU, QST, Mar. '95.
8. "Surface Mount Technology- You Can Work with It!"; S Ulbing, N4UAU, QST, Apr/May '99.
9. "An Easier Way to Build PC Board Enclosures"; Kopski, K3NHI, QST, Sep. 2003.

ARISS:

A way to get the next generation interested in amateur radio

Become involved and spread the word

J.A.(Tony) Hutchison VK5ZAI
Aust. ARISS Coordinator & telebridge station.
e-mail vk5zai@amsat.org

ARISS, short for *Amateur Radio on International Space Station* is about giving students and young people a chance to speak live with the astronauts on board the International Space Station as they circle 370 kilometres above the earth at a speed of 27,000 kph. ARISS also provides a radio link for the crew on board the ISS to enable them to communicate with their family and friends from virtually any point on earth they may be passing over at that time. We also provide a secondary communications backup system for NASA should it be required.

It's a program run by a small group of dedicated Amateurs from around the world and is sponsored by NASA, the ARRL, AMSAT, and Worldcomm MCI.

Any school worldwide can apply and have their students speak to the ISS providing certain criteria are met. Students are expected to be taught the basics of space travel and the type of research that is being conducted on the ISS by NASA and the International crew on board. This enables the students to ask intelligent questions when their turn comes around.

At present ARISS is setting up around one school contact per week except for weeks when the ISS is having a crew change or doing EVAs. Unfortunately due to the popularity of the program we currently have a waiting time of around two years, however any schools interested are encouraged to apply ASAP. Time soon passes by, and unfortunately the waiting queue isn't getting any shorter.

The actual link-up between the school and the ISS can be done one of two ways, by direct link or by a telebridge link.

(1) A direct link-up usually involves setting up an Amateur Radio Station at the school, complete with tracking antennas and a backup station. This is excellent and gives students an insight into what a complete Amateur Station is all about, but can involve a lot of work. It also means you have to wait for a suitable time for the ISS to pass directly over the school, as well the timing has to suit the classes involved, the Astronauts and NASA. This can add several months onto the waiting time, in fact probably more for Australia & NZ . This is because the crew works to UTC time which means that they start their day at around 5:00pm Aust time, and it's considered that 9:00pm is the latest that young students should be kept up at night. This gives a window of only 4 hours per day to work with.

(2) The second method used is via a telebridge link; this involves setting up a special interface unit with microphone, speaker and audio outlets so a large audience can hear both sides of the conversation at the school. The interface unit will be lent to the school for the occasion. This interface plugs into a standard phone line that's then patched through to the telebridge station selected to do the Earth to ISS radio link. In most cases this set-up is superior to a direct link-up as the ARISS telebridge stations have to meet a high standard and are experienced insetting audio levels and tracking satellites. This method allows for greater flexibility regarding the position of the ISS at the time of the link-up, as any of our eight worldwide telebridge stations is capable of handling the contact.

In both cases Amateurs are encouraged to set-up a satellite tracking display at the school (preferably with a data projector, the school may have one) so students and guests alike can see the ISS approaching the linking Amateur station. Power-point displays are also available for the event if required.

As can be seen a lot of work goes into setting up these school contacts around the world, and the astronauts on the ISS have a busy schedule so we must make the ten minute contact window a success.

The ARISS team meets via teleconference once a week and planning for each school is started three to six months in advance.

The things we must take into consideration are the times that suit the school. Remember this involves schools all around the world with different time zones and holidays etc. The timing has to suit the astronauts and NASA and the location of the ISS at the time of the link-up. This can be difficult as the altitude of the station is boosted periodically and this changes the orbit times. Adding to this we must allow for crew changes and EVAs so it can be seen a lot of hard work has to be done behind the scenes before the school gets the go ahead.

You are encouraged to contact your local school to see if they would be interested in applying. This is a great opportunity to expose our hobby, Amateur Radio, to the younger generation, You can become involved by helping set-up at the school when the time comes. I often point out to students, you CAN'T speak to an astronaut on your computer but you can via amateur radio!

My web site at http://www.electric-web.org has links to NASA educational sites for students of all ages, as well as the application form, example questions for students, and help for teachers. This can be downloaded in word format. Once a school has applied and been approved an ARISS mentor will be appointed to offer help to the teacher if required.

Space station talks to St Martin's in Mt Gambier

Tony Hutchison VK5ZAI

The ARISS contact between the ISS and St Martin's Lutheran College in Mt Gambier on Thursday 17th March was a great success. Ten students ranging from reception to year nine asked Astronaut Leroy Chiao all the twenty questions with around twenty seconds to spare before the ISS slipped below the horizon.

The students were prepared by their teacher Jeanie Axton who did a brilliant job organizing their questions on separate cards for them, and maintaining continuity of the queue during the linkup so no time was lost. The telebridge link was handled by Nancy WH6PN in Hawaii who did an excellent job handling the downlink and switching. The linkup was also carried live on the Internet and was relayed via IRLP and EchoLink.

A gathering of around two hundred parents and guests along with students and members of the South East Radio Group crowded into the schools music room to listen to the event. Tony VK5ZAI setup a power point display of space scenes along with Instant Track to show the progress of the ISS to the audience while they waited for contact to start. After the ISS had passed Tony answered numerous questions put to him by the audience. John, WD5EEV supervised setting up the line connections, and the participants were introduced by Will, KC6ROL who as usual did a great job.

The evening was covered by WIN TV, Bush Vision, a new community TV station, the ABC radio network, The Border Watch newspaper, and the WIA. Numerous photos where taken by members of the South East Radio Club and some of these will be available in a few days at http://www.arrl.org .

This was the seventh Australian school to have taken part in the ARISS project.

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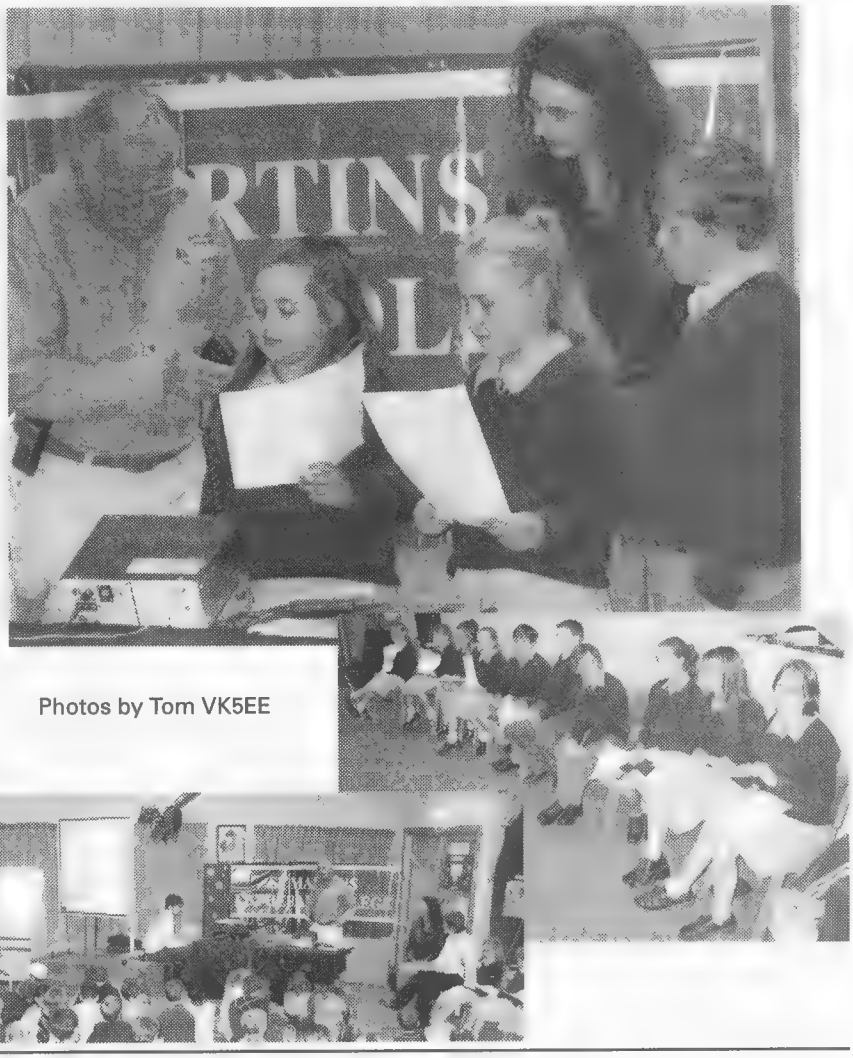

Photos by Tom VK5EE

ARISS: A way to get the next generation interested in amateur radio *continued*

Any further inquiries can be directed to me by emailing vk5zai@amsat.org or hutch@electric-web.org or phone (08) 8767 2878

Other sites of interest are :

The latest ARISS announcement and successful school list is now available on the ARISS web site. There are several ARISS web sites:

English: http://www.rac.ca/ariss/

French: http://c.avmdti.free.fr/ariss/index.htm

ARISS Europe: http://www.ariss-eu.org/

ARISS Japan: http://www.jarl.or.jp/ariss/

Other locations include:

Latest ARISS announcements and news

http://www.amsat.org/amsat/ariss/news/arissnews.txt

Successful school list

http://www.amsat.org/amsat/ariss/news/Successful_ARISS_schools.rtf

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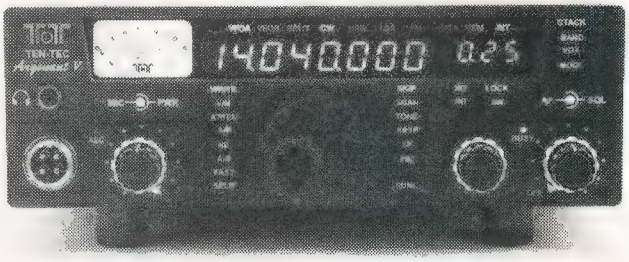


Argonaut V has the benefits and features of IF-DSP, in a modern 20 watt HF transceiver. Our philosophy is that "low power" need not be synonymous with "incomplete". Some low power rigs offer pieces as options. DSP as an option? Not with Ten-Tec. Some offer limited performance and features. With the new Argonaut V, we offer solid HF radio performance in a user-friendly format, competitively priced.

20 watts output power, all modes. SSB, CW, digital modes, and FM. Front panel adjustable from 1-20 watts output. AM operation at 5 watts carrier power (20 watts PEP). Metering measures forward or reflected power in switchable 2 or 20 watt scales.

A true general coverage all-mode HF transceiver. Receive .5 to 30 MHz continuous in user-selectable tuning rates of 10 Hz or 1 kHz. Transmit on all 9 HF ham bands 10-160 meters.

35 IF-DSP receive filters are built-in. No extra filtering to buy to operate any available mode! Filters are 200 Hz to 1000 Hz in 50 Hz steps, 1000 to 2800 Hz in 100 Hz steps; 4 kHz and 6 kHz in AM. An additional 15 kHz filter is provided for FM mode operation. Shape factors all 1.5:1 or better.

This little rig is a PSK31 dream. No accessory boxes necessary. Simply connect audio cables from the audio in and audio out jacks to your PC sound card and you're on the air. That's right, no interface, no dropping resistors in the TX line - plug it into the sound card and get on the air. While already suitable for digital mode operation, a high stability TCXO and a rear heat sink fan kit are available as options.

Like other recent Ten-Tec HF transceivers, the Argonaut V is a software-defined radio. All functions and features of the rig are stored in Flash ROM. To add new features, simply visit our website, download the latest, and it's as if your rig rolled off the production line a few minutes earlier.

Selectable metering functions. In receive, S-units. In transmit, selectable among 25 watt / 5 watt forward power scales, 25 watt reflected power scale, 1.0:1 to 2.5:1 SWR or collector current draw.

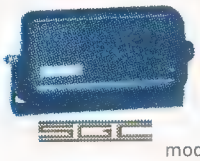
Band scan and memory scan. Memory scan has lockout feature for skipping constantly busy frequencies. Band scan can be set to scan between two user-defined frequencies of any margin. The operator can even program and scan memories for different modes.

CTCSS tone encode for 10 meter FM repeater access.

Heavy-duty cast zinc main tuning knob.

Variable CW transmit offset with tracking sidetone, adjustable 400-1000 Hz. Like all Ten-Tec rigs, Argonaut V is equipped with full QSK operation in CW mode. Built-in CW keyer with variable speed control, 10-50 WPM.

Argonaut V is equipped with a PTT hand microphone as standard equipment.



ADSP SPEAKER

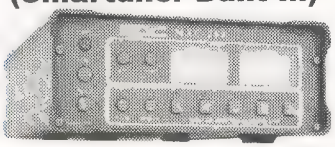
Works with the press of a button. Three modes: no noise reduction, the original ADSP, and the new ADSP2 noise reduction mode which provides up to 26 dB of noise reduction within the passband. ADSP2 Speaker is "One Touch" – simple to operate.

Z100 TUNER AND Z1000 HIGH POWER AUTO TUNER

MAC-200

MASTER ANTENNA CONTROLLER

(Smartuner Built-In)



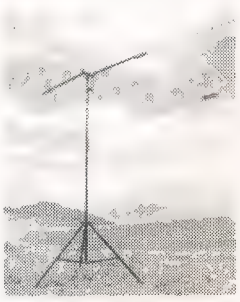
Controls

5 ANTENNAS
3 S0239 COAXIAL CONNECTORS
1 BALANCED ANTENNA OUTPUT
1 END FED LONG WIRE

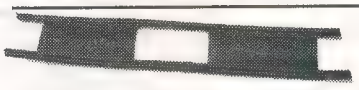
"The box that brought my amateur radio hobby back to life"

Buddipole

A Complete Portable Antenna System



- (9 bands, 2 - 40 meters)
- Tripod - ext legs•
- 8' portable Mast
- Rotating Arm Kit change configs
- Antenna Bag padded w/shoulder strap
- Extra S/Steel Tele Whip
- FREE – New 10-page modeling report



Order your 450 ohm Ladder Line NOW

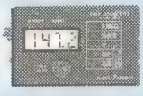
Ten-Tec 3003 Acro-Bat antenna hanger.

Made from UV resistant polycarbonate plastic, Hammers won't break it. Hardware is S/S Hang ladder line-fed or small gauge RG-58 or RG8X coax-fed wire antenna. or ladder line with internal pegs.

We have

SGC

SGC 237 Waterproof Auto Tuners
SGC 239 Economy Auto Tuners



Autek Antenna Analysers
Autek RF 2kW in-line Power meters

Lutron

Lutron Measuring Instruments

Vantage Pro Weather Stations

TEN-TEC KITS

41st Annual Amateur Radio Convention

&

Australian Fox Hunting Championships

South East Radio Group Convention 2005

June 11-12

(Queen's Birthday long weekend)

This year's convention will be held at the Mount Gambier Scout Hall in Margaret Street, on the southern side of the railway line near the centre of town. GPS coordinates are Lat: 37 49 57 Long: 140 46 37

Fox hunting, stalls, home brew competition, great company.

CONTACT FREQUENCIES : 2m Repeater 146.900 and 70cm Repeater 438.325

For info or table bookings contact Wayne VK5ZX on

(08) 8725 4335 or 0407 718 908 or email at vk5zx@internode.on.net

WIA news *continued*

Hobart BPL Trial

WIA director, Phil Wait, VK2DKN, the BPL Working Group Coordinator, has announced the WIA's 6-point plan for the upcoming Aurora Energy BPL trial in Hobart.

1. Determine the location of the trial;
2. If possible, measure the background noise level in that area prior to the trial;
3. Measure the noise / interference level during the trial;
4. Publish our results in the context of substantial interference to the amateur service and other HF users;
5. If local amateurs are affected by BPL interference, encourage and support their interference complaints to the ACA, and
6. On a wider scale, develop criteria for what constitutes substantial interference to the amateur community.

He said that the Group has been developing and validating methods and tools to assist in assessment and measurement of ambient noise and interference. Those tools are now ready for use. Being able to soundly argue that interference is substantial is essential to pursuing action under the interference provisions of the Radiocommunications Act.

Alf Chandler, VK3LC, 100

The Moorabbin & District Radio Club, is set to celebrate the 100th birthday of Alf Chandler, VK3LC with a special function on the morning of 31 May 2005. Alf has held an amateur licence for 81 years.

RSGB concerned for the future of the amateur service in the UK

A delegation from the RSGB led by its President, Jeff Smith, MI0AEX, is to meet representatives of the UK regulator, Ofcom, to discuss the future direction of amateur radio licensing.

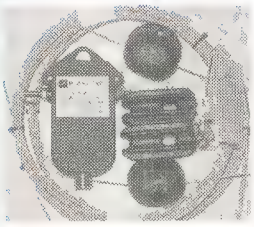
The RSGB says that it is strongly opposed to any steps that may be taken to bring deregulation and will fight hard to maintain the status of radio amateurs and the privileges they currently enjoy.

ar

Antennae

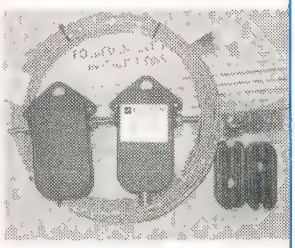
SWCS-KIT HF ANTENNA 'HomeBrew'

(with a lot of help from your Bushcomm kit)



A kit version of the popular SWC100S single wire, but you have the satisfaction of constructing the antenna. Easy-to-follow instructions, construction uses common tools. You save money and have fun. Once completed it's a replica of the SWC 100S, a single-wire, base-situation antenna with S/S elements. The 34 metres total length can suspend from any structure, trees, buildings, (avoid going over iron roofed buildings). Can be mounted horizontally or as an inveted V. Full diagrams.
Frequency Range: 2-30MHz
Imput Impedance: 50 OHM
Power Input: 100 Watt AM (250 Watts PEP)

FOLDED DIPOLE FD 100 HF MULTI WIRE ANTENNA



There is a gap in the HF market for a good quality budget-priced Antenna. The Bushcomm FD-100 is an economical folded dipole alternative to our best-selling model, the BBA-100. The Folded Dipole not only covers the same frequency range as the BBA-100, it has the same overall length and power input of 100W and, best of all, **no tuner is required**. The Folded Dipole is a multi-wire that is lighter in weight and, having only 2 wires (as opposed to the BBA-100's 3 wires), it has less wind loading and an SWR of better that 2.5-1 (typically 1.5-1.6).
Just because this is an economy-priced antenna, quality has not been compromised. We use the highest quality parts, bulk- bought to keep price down.
We offer an even cheaper kit version of the FD-100, the FD-KIT. With simple step-by step instructions, and all the parts needed to construct the same antenna, all you need are some basic tools and time.

ELECTRICAL
Frequency Range: 2-30MHz
Imput Impedance: 50 OHM
Power Input: 100 Watt AM (250 Watts PEP)
Input Connector: UHF-type socket
Antenna Length: 27m
Mast Spacing: - 32m Horizontal configuration
18m inverted "v" configuration (with a 10m tower)

Bushcomm

PROUDLY AUSTRALIAN OWNED AND MANUFACTURED

PO Box 2028, Midland DC 6936 Western Australia
80 Stock Road, Herne Hill 6056 Western Australia
PHONE: + 61 8 9296 0496
FAX: + 61 8 9296 0495
EMAIL: bushcomm@bigpond.com

See more at

www.bushcomm.com.au

News from...

VK2

Compiled by Tim Mills.

The AGM of the NSW Division was scheduled to be held on April 16th. There will be a report in the June notes. An election was required as eleven nominees contested the nine positions. There were ten Special Resolutions and three Motions presented to the meeting. NTAC Co-ordinator Brian VK2WBK circulated all members with a questionnaire to update the State's repeater data base for the next Callbook. If your area is still to reply, please do so asap. Information is sought from individuals as well as clubs and repeaters group.

E-mail contact with "Amateur Radio - New South Wales", the trading name of the NSW Division, has recently been confined to vk2wi@ozemail.com.au as the previous address suffered problems. The postal address is Box 9432, Harris Park 2150. Fax 02 9633 1525. Telephone 02 9689 2417. The Bookshop is to be found at "Amateur Radio NSW Technical Bookshop".

The Trash and Treasure and Homebrew meeting for this month is scheduled for Sunday the 29th.

Terry VK2UX is currently conducting a weekly theory course at Amateur Radio House, Parramatta. The course has recently been moved to Wednesday night to allow more to attend. They will soon be having their first exam - a Regulations paper. From last year's course - all candidates are now licensed, advised Terry. This year's class will end about mid year. All our educators are waiting for the new licence and syllabus to be released.

Waverley Amateur Radio Society

It is now 86 years since this small but very active Sydney club was founded. Its permanent clubhouse is located on the waterfront at Rose Bay and serves amateur radio and electronics enthusiasts living in the inner city area and southern and eastern suburbs.

Major improvements are currently taking place to its premises, the clubroom and operating facilities.

Meetings are held on the 3rd Wednesday evening of each month. The clubhouse is also open in the afternoon of the 1st Saturday of every month, when work may be carried out to improve the club's amenities and to fix members radio gear. As well, some just go along for a ragchew or to operate the club station.

This year the club's major event, the annual auction, will be held on the morning of Saturday, June 18th. Detailed information is available on the club's web site.

Anyone interested can find information on all aspects of the club on its regularly updated web site at www.vk2bv.org or call Simon VK2UA on 02 9328 7141.

Around some of the VK2 Clubs

•The Mid South Coast quarterly meeting is a week later this month due to other bookings at the Little Forest Lodge, Milton. Now on Saturday the 14th.

•The 30th Oxley Region Field Day at Port Macquarie will be held on the June long weekend.

•The Far South Coast held their AGM in March. They sponsor two repeaters, VK2RFS on 6750 and VK2RSE on 7375.

•Tamworth Radio Club restored their 6750 VK2RTM after it had a two year holiday. They meet on the first Friday of the month.

•Coffs Harbour and District ARC held a special meeting last month to discuss the future of the repeaters in their area.

•St. George ARS commenced a series of monthly lectures last month on the various data modes.

•Chifley ARC in Western Sydney meet every Saturday afternoon at the Good Shepherd Church, Plumpton.

•Urunga hosted another successful Easter Convention. Over 55 registrations. Fox hunt competition was again provided by the VK3 experts.

•Summerland puts out a weekly newsletter by email and provides extensive relays of VK2 and VK4 news sources.

•Hunter Radio Group conducts a Monday evening news session which includes highlights from the previous Sunday VK2WI news.

•Waverley ARS have a project afternoon on the first Saturday each month.

•Manly Warringah transmit a Radio School lecture every Tuesday evening on their two metre repeater VK2RMB - 6875.

•Gladesville ARC continues to provide a technical TV transmission on Wednesday and Sunday evenings on the 70 cm ATV channel.

•The Great Lakes Club on the lower North Coast is planning to add a 70 cm repeater to the VK2RGL 7100 site.

Thanks to all who contribute to the VK2WI news sessions. The dedicated group of VK2BWI operators continue to provide 'human operated' morse on 80 metres - 3550 kHz - many evenings per week at 8 pm.

Some of the text from the Sunday sessions is on the website. Over summer Jack VK2XQ provided a six metre activity report. Bill VK2ZZF provides a monthly astronomical report. Some wonder what radio content is in stars. Bill often includes details of interrelated activity and of nets on the subject. Many amateurs have a hobby interest in the stars as well as radio. Thanks to Jack and Bill for contributing to the news session. We invite all clubs and listeners to submit news. Every bit helps, even if it is only dates for the Coming Event column. VK2WI reaches a large audience. As the bottom of the present solar cycle approaches, the lower HF VK2WI channels provide good state and interstate coverage. The evening 40 metre AM transmission is early enough to beat the overseas broadcasters.

VK2WI is seeking more operators, both announcers and engineers. The Sunday format has settled down into two different news sessions. The morning, has a relay of VK1WIA and selected segments. The evening session provides expanded coverage of the segments shortened for the morning, as well as evening-only items. For times and frequencies, see the Directory, page 56.

Oxley Region Amateur Radio Club Inc.

ABN 12 164 305, P.O. Box 712 Port Macquarie N.S.W. 2444

Covering Port Macquarie and the Hastings Valley.

30th Anniversary Field Days Celebration 2005

On the Queen's Birthday Long Weekend, 11th and 12th of June, the Oxley Region Amateur Radio Club will celebrate its 30th Anniversary Field Day weekend. All members of the Amateur Radio Fraternity and their families are invited to attend at the usual venue, the Sea Scout Hall in Buller Street, Port Macquarie on the Western Side of Kooloonbung Creek next door to the "Country Comfort" Motor Inn.

While en route participate in the Foundation Members Mobile Contest. The rules will be published on the Club Web-site.

Registration will commence at 0900 Saturday and 0830 Sunday. Tea, Coffee, biscuits and slices of Birthday cake will be available free as soon as the Billy boils, with cans of various soft drinks also available at reasonable prices on both days.

The Fox Hunts will commence at 1000, Saturday, with the 2m 1Tx, and a 2 m Pedestrian at 1130, followed by the 10m 1Tx (Non Amateur Passenger) at 1345 and the 2 m Talk In Fox Hunts at 1530. Sunday Fox Hunts will be the 80m 1Tx at 0900 the 2 m 2Tx at 1030, 10 m 1Tx at 1245 and another 2 m Pedestrian Fox Hunt at 1400. Each day 1st, 2nd and 3rd Prizes will be awarded after completion and results confirmation of each Fox Hunt Event and Participation Prizes will be given to all entrants in each Hunt by the Event Marshall.

The Oxtales Trophy for the Fox Hunt Point Score will be awarded on Sunday afternoon.

At 1800 Saturday we hope all will gather at Westport Bowling Club where meals may be purchased at the Club Bistro. At 1930, Guest Speaker Michael Owen, VK3KI, President of the WIA, will address all who attend in the Westport Bowling Club Function Room. To assist in catering for the Meal/Guest Speaker evening please advise intending attendance by contacting the Club as indicated below.

There will of course be displays by leading suppliers of Amateur Radio Equipment and tables of used Amateur Radio Equipment and other items for sale and the WIA Bookshop in attendance.

Our biggest field day ever, over $5000 in value

The first 50 Visitor Registrations each day will receive a special 30th Anniversary Sample/Show Bag.

The Saturday lucky Registration Prize is 3 nights for 2 people in a Luxury apartment at the Oxley Cove Holiday Apartments in Port Macquarie. Ph. 1800 809 193

Saturday is Australiana day with Guest Speaker, Michael Owen, VK3KI, President of the W.I.A.

Saturday Raffle is an Aussie Goods Hamper with 10 Prizes, total value $500.

Saturday lunch at 12.00 will be Sandwiches & fruit or vouchers for Hamburgers, Fish and Chips, Pizza and Rolls will be available.

The Sunday lucky Registration Prize is 2 nights in a luxury ocean view cabin (2 B/R, 5 people) at Sundowner Breakwall Tourist Park, Port Macquarie, Ph. 1800 636 452

First Prize in the Sunday Raffle of Electrical, Computer, Telephone and useful items, is valued at $500 with 9 additional prizes totaling $1000.

Sunday Lunch will be a Barbecue with dessert of Fruit Salad and Ice-Cream.

We will have Ladies Raffles, Hourly Lucky Spot Prizes, Best Home Brew equipment competition along with lots of crosswords and other fun competitions to test and stimulate and a Memorabilia Display Board. There will be a Prize and the Bob Todd Motors Trophy for the Best Amateur Radio Vehicle and 3 prizes for the Foundation Club Members Field Day Mobile Contest as well as a Best E-mail competition and the Oxtales Cup Fox Hunt Point Score Trophy.

E-mail us on vk2bor@tsn.cc and tell us if you are coming. Let us know how many years you have supported our Field Day and share your memories. You will be in the draw for some great prizes from our E-mail Display Board. Coming or not you will still be in the draw.

Lunch for both days is included in the Registration Fee.

Registration Fees

Both days: $15 for men, $10 for ladies and $10 for school age children.

Saturday or Sunday only: $10 for men, $7 for ladies and $5 for school age children.

Contact details for any queries and catering

Club e-mail vk2bor@tsn.cc

Bill Brooke VK2ZCW Ph. 02 65810547, e-mail cabrooke@tsn.cc

Bill Sinclair VK2ZCV Ph. 02-65839302, e-mail bilsinvk@ecopost.com.au

Come one and all! We are looking forward to your company. Reminisce with us and help us celebrate our 30th Anniversary Field Days. Enjoy beautiful Port Macquarie, bring your family and friends, there are two shopping centres, Movie Theatre, Museum, Surf Beaches, heated pool and other attractions within walking distance of our venue.

Plan ahead

ALARAMEET

9th to 12th September 2005

http://users.ncable.com.au/gsyme/AlaraMeet/

2005 Wadda Cup Contest

24 September, 2005

News from...

Summerland ARC

John Moyle Field Day

VK2SRC finds a new site at Acacia Plateau

Chris Meagher VK2LCD

Last year the Summerland Amateur Radio Club went to a new site for the John Moyle Contest, and we were successful in making more contacts and improved our score. It was decided to go to the same spot this year. The location is only a hundred metres or so south of the VK2/VK4 border, 1030 metres up at the north-eastern edge of the Acacia Plateau, 12km east of Killarney.

On our previous visit, we could see across to some of the spectacular rocky peaks around Mt.Barney and to Mt.Superbus, the highest peak in northeast VK2. This time, we found the site hemmed in by thick pines and hakeas, which had tripled in height. Fortunately we had the benefit of tall portable towers to get the antennas in the clear. The VHF/UHF antennas used were a phased pair of 9 element quads on 2m, a 6 element yagi on 6m and a 15 element yagi on 70cm.

The HF antenna was changed during the course of the contest, starting out with an inverted-V dipole cut for 40m, on an 8m ex-military portable mast. This worked extremely well, 208 contacts on forty attesting to this. When changed to an 80m dipole for the evening, performance was poor, for reasons as yet unknown. As I write this the logs are still being prepared, but the score looks like showing a slight improvement over last year.

The job of driving for 3 hours plus, setting up, operating flat strap, pulling down and driving home, was again a big task. This year it was made a lot easier by the presence of 4 extra personnel. It was wonderful to have a break and be served with food off the barbie. The club has now done 4 successive John Moyle portable operations; each time our field skills improve and each time something is learnt. We know nevertheless, that Murphy and Sod are ever so patiently waiting nearby in their tireless quest to see things go awry.

The SARC team was Karl VK2XL, Rodney VK2HRW, Kris VK2MRN, Chris VK2LCD, Rob VK2KGK, John VK2JWA, Scott SARC112 and Mark, SARC113 (the latter two being associate club members, who are non-licensed persons interested in radio communications). Thanks to those faithful club members who called us, and cheers to those more distant stations. The furthest contacts were to Alaska and Canada on forty, which scored no points but provided a thrill. See you in 2006, from where we do not yet know.

(See also Inside back cover)

Photos: views of the site

VK3

Geelong Radio and Electronics Society (GRES)

The first 3 months of this year have been highly productive. Members have been building portable/mobile HF (screwdriver)antennas. This has been the most ambitious project ever tackled by the members. All participants in the project should complete their antennas within the next few weeks. When all are completed we will have 16 working all band HF antennas. Ground work has already begun on the next project. This is to be a GPS unit to be used for APRS work.

We had one visit during March.This was to the "Neighbourhood Cable" offices in Geelong.We were given a talk about the services they offer such as cable TV, telephone and high speed internet connection. This was followed by a tour of the premises. We saw how the satellite TV signals were received and then distributed to the network. This distribution is by fibre optic and coaxial cable. It was also explained to us how amplifiers are used within the cable network.These amplifiers ensure that customers get a good quality signal at all times.

So far this year we have had 3 guest speakers. The first was a representative fron "Dremil" tools. He demonstrated the various hand tools available from his company and also donated equipment to the club.This will be a most valuable addition to our workshop.

A representative from the local "Jaycar"store showed us the latest range of stocked items. These included multimeters, AC/DC current clamp meters, digital TV cards for PCs and many other new products.

A most informative talk was given to us by Bob Tait VK3UI on automotive electronics. He talked at length on the new systems that we can expect to see in new cars in the foreseeable future. Many of these new systems are to improve the safety not only of the driver and passengers but also to avoid collisions between vehicles. One item to be deleted from cars in the future will be the distributor. So take note all who like HF mobile, no distributor so no more ignition noise. However with more computer control in cars we may have problems with computer generated harmonics.

Visitors to Geelong are always welcome to attend our Thursday evening meetings. These are held at 2000 hours local time.The address is 237B High Street Belmont, at the rear of the Belmont Youth Club. Our museum located in the Old Geelong Gaol is also open to the public every Saturday and Sunday.

Rod Green VK3AYQ

VK4

VK4 WICEN

(State Co-ordinator, Ewan McLeod VK4ERM)

WICEN in VK4 holds a net every Sunday on 7075 kHz from 2230 UTC. The net calls in regular stations and then invites new stations. Mix it with other WICEN ops and call in on the net!! With the cyclone season drawing to a close the Bundaberg WICEN Group is standing down from a pretty busy training season. At the start of summer the group had two one day training sessions followed by practice nights on the local repeater, while some five members attended an afternoon SES table top exercise in March. Bundaberg WICEN also provided lectures in Message Writing Practices for both SES Welfare and Red Cross. Realising that no local WICEN Group can sustain a prolonged activation in a worst case scenario without help from outside operators, Bundaberg and Hervey Bay WICEN are planning a full day combined training session on 22nd of May.

Murrumba Communications Group

Repeater VK4RSS is back on air after a very long time on the workbench and the group thanks the techs at Villcom Caboolture. VK4RSS is primary Slowscan TV (remember no novice calls please!) and voice is secondary. 70 cms on 438.575 no tone, open access 24/7. This repeater is supplied for the use of ALL Licensed Amateurs by the MURRUMBA COMMUNICATIONS GROUP. 'Computers are like air conditioners, they don't work properly after you open your windows'.

73s de Ian VK4HX

Brisbane VHF Group

It's on again - the Brisbane VHF Group's "Antenna Day". Sunday 10 July in the grounds of the Mayfield State School in Carina, Brisbane, and all interested amateurs are invited. More information will be made available as July approaches, but mark your calendars now and plan to be there. Light refreshments are expected to again be available on the day.

From the QAC

Bob Tomkins VK4DOG has agreed to join the QAC as a representative of the Gold Coast Region. Bob lives in Beaudesert Shire high atop Mt Tambourine, Hey. Must be one of the neighbours of our very own Contest Editor Chris VK4AA/3CE! Bob is being brought up to speed in QAC matters, details of the past meetings, WIA constitution etc, by Secretary Ken VK4KF. Welcome aboard VK4DOG Bob Tomkins. So I hear you ask, why another pair of helping hands to our QAC? Well in short, the Constitution of the WIA sets out initial members of the Queensland Advisory Committee were those who were the members of the WIA Queensland Division Council at the creation of the national WIA. From time to time new appointments will be made to the QAC to meet

requirements. QAC elections will be called for a new committee to take effect probably in May 2007 as indicated in the WIA constitution. To meet current requirements two new appointments have been made to the QAC to strengthen our regional representation: Harvey Wickes VK4AHW Sunshine Coast Region Representative Bob Tomkins VK4DOG Gold Coast Region Representative. Both will bring a wealth of knowledge and skills in support of WIA activities in Queensland.

Redcliffe work on

The Redcliffe and Districts radio club has been doing a large amount of work upgrading the clubs 2 metre & 70 cm repeaters. The 2 repeaters are situated at Wamuran, which is approx 15 km west of Caboolture on the north side of Brisbane. The 70 cm frequency is 438.325. The 2-metre link, which is on 146.925, has for the last 4 months also benefited from the inclusion of Echo link. If you like to call in to the north side of Brisbane look up VK4KCK on Echolink. Redcliffe has also started a rebroadcast of Q5 education hour. After an overwhelming vote of support the club set about building the necessary hardware for this initiative. The broadcast occurs Tuesday 8pm and everyone is invited. They hold check-ins at the halfway point and at the end. Check-ins on the club e-mail which is RDRC4@hotmail.com (Secretary of the Redcliffe & districts Radio Club)

Digital matters to the QDG

The sound card interface project kit offered by the Queensland Digital Group can be seen on the web, for those reading the text edition it is at www.powerup.com.au/~richarda/SCI-010.htm. For those listening, you should know the drill by now... go to wia.org.au click on the news broadcast link and read this week's news for Richards URL. You can use a second sound card installed in your computer and free or share software to access a host of modes of operating data via radio. This covers packet, Slow Scan Television, PSK31, RTTY and even Morse code. This unit interfacing the computer to the radio was developed to provide most flexibility for the job. From Richard Atkinson, Secretary of Queensland Digital Group".

Radio Scouting

The 2005 JOTA and things are looking better for JOTA in the great SouthEast this year even with Baden Powell Park being activated. The Queensland Digital Group under the guidance of Richard VK4ZA is coordinator this year. QDG do need a hand or two to test some radio equipment and repair antenna leading up to activities this October, for details please contact VK4ZA on 3376 5231.

http://www.scouts.com.au/international/jotafront.html

VK4 Enquires to: - Dr Paul Rollason, International Commissioner, QLD

E-mail bc.international@qldhq.scouts.com.au

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VK5

John Moyle Field Day in VK5

Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

As is traditional, AHARS had a members' Buy and Sell meeting in March. Many bargains were exchanged. Some of the items on sale prompted the exchange of ideas or a discussion of projects old and new. The meeting was enjoyed by all.

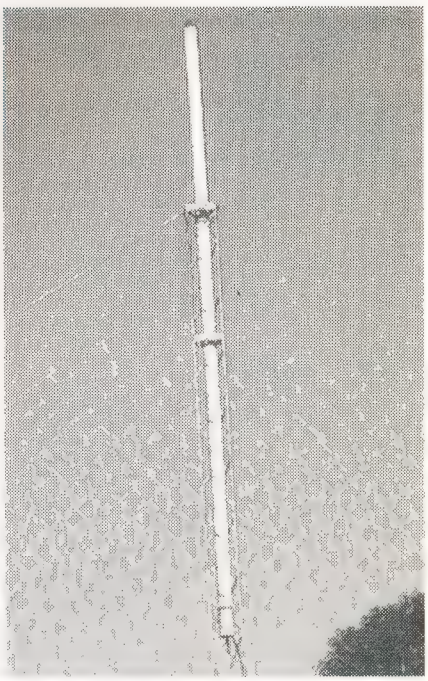
On the Friday following that meeting some of the members headed off for their John Moyle Memorial Field Day locations. AHARS members were involved in at least three sites, this year, because of their involvement with other groups beside AHARS. This is great as it gives us all much more opportunity to take part and to practise our away-from-home skills and equipment.

The main group operated from a bush block near Swan Reach as they have done for several years, now. They used the club callsign VK5BAR. Some were operating with a Scout group using VK5BP at Ashton Oval. Members of both AHARS and NERCS were on Palmer Hill and members of both AHARS and EARC were portable nearer to their home QTH. A busy group, especially when we include the members who used their home stations as well.

The aerials used at Swan Reach were all wire aerials, the same as we have used for several years. "If it ain't broke, don't fix it." If it has worked before why change just for the sake of change? We erect them all either on Friday evening or on Saturday morning and they are all taken down and stored for next year before the final barbeque lunch.

This year there were eleven operators and we had contacts on five out of the six bands we tried. 10-metres was silent this year although we have had contacts in other years.

As always the variability of propagation was a topic of conversation. Usually the



The vee-beam

40 metre station continues into the wee small hours of Sunday morning but this time it was 'dead' by about midnight. Some operators were surprised at the amount of sleep they got this year compared to in other years!!

So far out in the country, away from all powerline and other city interference, 80-metres was a dream band. If only it was usable in the daylight hours as well! Ah well, we can wish, can't we?

In general all the operators felt that the bands were quieter but when we added up the number of contacts we found that what we had lost on some bands we had gained on others. The results will tell if everyone had the same experience.

One does wonder if the Boxing Day tsunami and the importance amateurs played yet again in providing communications during a national emergency, had something to do with the increased interest in field operations.

Thanks John Moyle for making amateurs in Australia realise how necessary it is that we keep our capacity to operate when the normal main power supplies fail. National communication bodies cannot usually operate on a car battery or portable generator.

The photograph shows the 40 metre inverted vee-beam in place (two of the white guy ropes are clearly visible. The vee-beam can just be seen as a fine line from the top of the length of plastic water pipe toward the top right hand corner of the picture). A balun sits in the water pipe with the coax running down the middle. A wire dipole for 20-metres, a G5RV for 80-metres and an unterminated Zepp for 15, 10 and 160-metres completed the array used.

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Elizabeth ARC

Colwyn Low VK5UE

Four members of the EARC decided to operate independently in the John Moyle Field Day, but to operate from two sites Wirra Picnic Ground and Hope Hill. These sites are about 8 km apart. Hope Hill is a good VHF/UHF site and Wirra Picnic Ground has plenty of flat area for HF wire aerials.

HOPE HILL

34 deg 45.42' S 138 deg 48.76' - PF95jf

WIRRA PICNIC

34 deg 41.71' S 138 deg 50.09' - PF95kh

Wirra Picnic Ground is within the Para Wirra Recreation Park therefore Parks and Wildlife had to give permission. The site provided a picnic shelter and toilets. Hope Hill is within the Mt Crawford Forest, so the Forestry had to give permission to operate there. As it was Fire Ban season this had to be a 'cold camp'.

The group was Merv VK5MX, Steve VK5AIM who operated the club call VK5LZ, Stuart VK5ADE and Colwyn VK5UE. Merv used his multiband dipole for HF and whips for VHF/UHF. Steve used VK5UE's recently restored TH3, a multi band dipole and hand-helds, Stuart used whips for VHF/UHF and a small mast with 2 m and 70 cm at Hope Hill together with whips on his ute. Colwyn used his dual band vertical for 2m and 70 cm and a 13 element yagi on 23 cm. Power came from car batteries and two GMC generators which ran without a hitch for about 6 hours each. Murphy attended and with all that power we did not have any lights!

HF aerials and the shelter shed at Wirra Picnic Ground

(See also inside back cover)

VK6

Will McGhie VK6UU

Almost gone

The VK6 WIA Council met on April the 5th 2005. Council still has to finalise the bank account and then close it. The Advisory Committee will still need some funds, for example a request has been made for VK6 to send a person East for a meeting on the Foundation License.

A question asked at the last Council meeting was what would be the exact role of the VK6 Advisory Committee? There has been considerable contact between the National WIA and VK6 in regards to a wide variety of winding up issues and some small issues in regards to insurance are still ongoing.

So ends the VK6 WIA 1919 – 2005

Country amateurs

The last VK6 WIA Council meeting discussed country amateur radio clubs? Many of them appear to have either dissolved or are in the process of doing so. There has been a steady decline over many years. The suggested answer that in the 1980s mining was a rapidly growing employer and many amateurs moved to the mining areas and formed radio clubs. The mining companies are now flying their workers in and out. Many workers don't live in the country areas but work on site for a number of weeks and then fly home for a week or two off. It could be that simple.

News from...

VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au
Regional Web Site: www.reast.asn.au

Two metre contact firsts achieved

Rex, VK7MO our resident digital mode expert has reported that March 13-25, 2005 was a record setting fortnight that saw digital mode records set on 2 metre between VK0, VK3, VK7 and ZL.

In VK7 & ZL the first 2 metre contacts between VK7 (VK7MO & VK7JG), ZL (ZL3TY) and VK0 (Macquarie Island, VK0MT) were made using FSK441a mode. Dave, VK0MT, was using 100 watts to a 2.3 wavelength (10 element) beam. This gave Joe, VK7JG the first terrestrial worked all VK call areas on two meters – congratulations Joe.

Following these record breaking contacts, Peter VK3KAI, Dave, VK3HZ and Charlie, VK3FMD (2123km) attempted and were successful in making FSK441a with Dave, VK0MT. Dave then tried some EME using JT65 and completed the first VK0, 2 metre EME contacts with W5UN and KB8RQ. Congratulation to all involved.

Tassie Devil Award alive and well!

In the past month two people have been awarded the Tasmanian Devil Award. We congratulate Hayden, VK7HAY and Grahame, VK3HGK. Take a look the Regional website for award details.

SSTV Mode and Novice Licensees

Some clarification was sought from the WIA/ACA Liaison Team, WIA Technical Advisory Committee and the ACA in relation to the Amateur Licence Condition Determination on whether Novice/Novice-Limited licensed amateurs can use SSTV modes in their frequency allocation. Unfortunately, SSTV are 2F and 3F modes and therefore are not permitted on Novice bands.

BPL in VK7 – Aurora energy's 2nd trial

By the time you read this, the second Aurora BPL trial will be about to start or may have already started and will cover 500 Hobart homes. The WIA has released their strategy for the VK7 trial and I encourage all VK7 amateurs to familiarise yourself with this document. VK7 amateurs are looking to work with the National WIA BPL team to assist where possible with noise floor measurements. A VK7 BPL Watch web page has now been established on the Regional website. Take a look and become informed!

Central Highlands Amateur Radio Club of Tasmania

CHARCT remind all that there is a Morse Refresher Net Wednesday evenings at 8:00pm hosted by Roy, VK3GB on 3585kHz. Roy has kindly donated his time to getting this NET up and running.

North West Tasmania Amateur Radio Interest Group

NWTARIG regular meetings have commenced with one being held on Saturday 30 April 2005. The venue was the Lions Club facility at the Ulverstone Show Grounds in Flora Street West Ulverstone.

Interested persons wishing to contact the club can email them at nwtarig@spamex.com and the Club's web address is www.vk7ax.tassie.net.au/nwtarig/

Northern Tasmanian Amateur Radio Club

April 13 was a "Ladies Night" dinner meeting at Twigs Reflection Restaurant overlooking the Tamar river. Special guest speaker was Mr Anthony Coupe, from Australian Customs who has just returned from Cairns and his stories both amused and amazed, a great night was had by all.

A kindly reminder - Mt Arthur repeater (VK7RAB) is a solar power repeater and with the coming of winter and hence shorter daylight hours, short overs would be most appreciated.

We welcome Rick Becker who has his new callsign – VK7HBR and Roger Simmonds, harmonic of Tony, VK7TY who received his callsign so listen out for VK7HRT on the air as well.

Radio and Electronics Association of Southern Tasmania Inc.

REAST members - Gavin 7HGO, Gary 7JGD, Stu 7NXX, Peter 7TPE, Roger 7XRN, John 7ZZ and "Tiny" Damien were involved in the Southern Tasmania

Exhibition attendees at the REAST Amateur Radio Stand

Endurance Riders event which was held on and around the Ringrove property south of Orford. Six check points where manned around the 120km course. Great job guys!

There is now a second IRLP node in Hobart courtesy of Clayton, VK7ZCR. Node number is 6720. Frequency is 439.100MHz (simplex). Location is Lenah Valley.

Over the weekend of 2 & 3 April, 2005 REAST displayed and promoted amateur radio and electronics to thousands of people at the biennial Model Makers and Collectors exhibition at the Derwent Entertainment Centre. There were 16 licensed amateurs who took time to come and help as well as provide equipment and time for this event. A number of enquiries were received about training, the names of persons interested in the Foundation Licence recorded and 5 Novice Course CD training packs were sold. Over 100 information leaflets were taken together with numerous back issues of Amateur Radio magazines and other information brochures.

This was a great club event and opportunity to show the general public what amateur radio and electronics is all about. Thanks to all involved especially Ken, 7DY for coordinating.

Photos of the event are available on the Regional website.

Finally, the REAST Committee, after much deliberation. has decided to move Repeater 2 from Guy Fawkes Hill to the Domain prior to the expiration of the lease in Feb 06.

The Committee acknowledges that this will affect users of the repeater in both positive and negative ways dependent on your location. To give you an indication of what you can expect in relation to signal strength from the Domain we suggest that you take a listen for the 146.850MHz output from VK7RAD. This is an equivalent power level and antenna arrangement as will be installed for the new R2 on the Domain.

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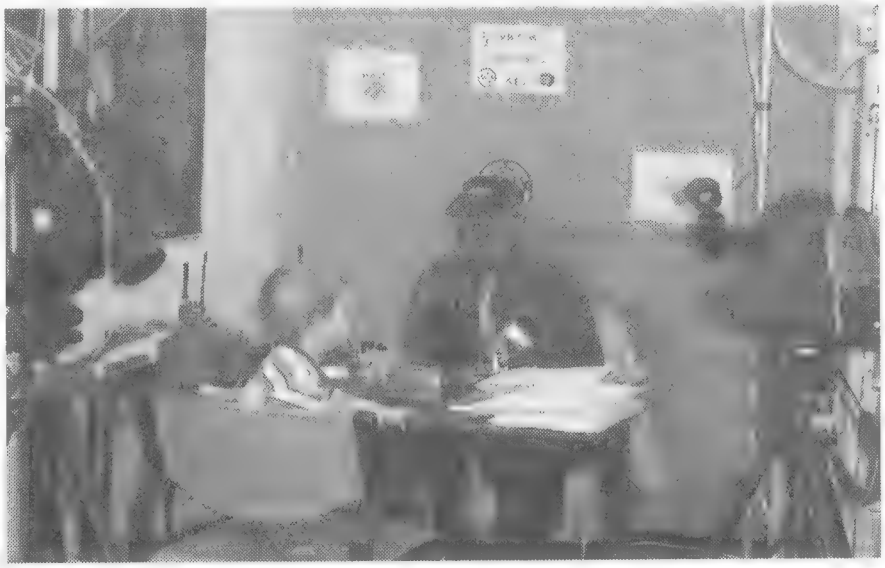
Hayden, 7HAY, Reg, 7KK and Jack (back) 7IL on the stand.



Our octogenarian John, 7JK (with "hatcam") and Reuben (aged 3, harmonic of 7TW) at the construction desk.

Clubs ~ plan ahead

When is your major field day in 2006?

Does it clash with another event ?

The 2006 call book plans to list all major events for 2006.

Start your planning now!

Advise: callbook@wia.org.au

ALARA

Christine Taylor VK5CTY

The Thelma Souper Memorial Waro Contest

This Contest, run by WARO, ALARA'S New Zealand equivalent was held over the two evenings of the first weekend in April. It is entirely on 80 metres and allows for repeat contacts every half hour, but it only runs for two hours each night, so it is quite different from the ALARA Contest.

It is the first time I have participated, I regret to say, but it will not be the last. I didn't make many contacts but it was a good Contest nevertheless.

There are a number of WARO members in VK land so it is possible to compete even if you can only hear VK stations. OMs may participate as well as YLs, and both CW and phone may be used.

To make it even more interesting there is a special station, ZL6YL, which operates for only a short time on each night, which becomes a multiplier if you contact it. I know it was calling me but I just couldn't make a legitimate contact no matter how hard I tried. Maybe I will next year.

There were some good scores by the end of the Sunday session and a very good (first time ever in a Contest on her own) score by Lesley VK5HLS as we heard on the Monday Net.

Now all we have to do is send in the logs, no matter how big or small to :-

Bev ZL1OS, 34 Cobham Drive, Kawerau 3075, New Zealand.

A busy weekend or two for some ALARA members

The weekend of March 19/20th was the John Moyle Memorial Field day weekend. For some of the VK5 members who are also members of AHARS this means sharing in the Field Day at the 'bush' QTH of Geoff VK5TY and Christine VK5CTY near Swan Reach, about 2 hours from Adelaide. As usual the YLs did most of the food preparation but they also took their turns on the radios.

For the ones who were unfamiliar with Contest operating it was a whole new world of amateur radio. There were two very new YL operators and two who have done it before, this time. Lesley VK5HLS has had her licence for a while and has joined in the Monday Nets so she had microphone skills but had never kept a log before. For Jenny, not yet licensed but able to operate as a member of AHARS everything was new.

Tina VK5TMC and Christine VK5CTY have been broken in to the Contest/Field Day experience before so were more comfortable either as a log keeper or as an operator. But by the end of the Field Day Contest everyone had tried all the bands available and had done their share of all the tasks, and had FUN doing it.

Some photos of YLs operating in the bush will appear on the front cover of this magazine later, so the one with this column was actually taken over the Easter weekend when again there was a mini-ALARAMEET with five ALARA members and five OMs present.

Over the Easter weekend two towers were erected, ready for a vee beam aimed at Europe (sometime), by the OMs. On the last morning when everyone was admiring one of the towers Lesley offered to climb the tower to undo the ropes that had held the tower upright while it was cemented the day before.

Geoff had planned to do that after the guests had been farewelled, (he has been climbing towers since he was about 17 so is quite comfortable at heights) but he accepted Lesley's offer when he realized she had no fear of heights and wanted to do it. The photo shows what she meant. Thanks Lesley.

Lesley VK5HLS up the tower undoing the ropes

One of the Bicentenary prizes returns

During our Bicentenary year (1988) a special competition was run and a number of prizes were awarded. One of those prizes went to Melva ZL4IO. Recently, as part of a clean-up Melva decided that the time had come to offer her prize back to ALARA to be given into the care of someone else.

Margaret, VK4AOE had crocheted a lovely table centre incorporating a number of Australian birds and animals. in recognition of the uniqueness of Australia, in its Bi-centenary year.

The table centre will be one of the items some lucky person will take home from the ALARAMEET in Mildura later this year.

It may be one of the prizes in the Special Effort, or Marilyn may have some other plan for it, however it will be lovely for all those in Mildura to be able to see this beauty after so many year across the Tasman. Here is a photo to give you some idea of it.

DON'T FORGET THE SPECIAL EFFORT whether you can be in Mildura

Mavis Stafford, Bicentennial Trophy Consolation Prize donated by Margaret VK4AOE

Silent key

Ron MacNamara VK4ESC

Ron MacNamara, VK4ESC, passed away suddenly at home on the Sunshine Coast, Queensland, in the early hours of 18 February 2005. He was born at Earlwood in Sydney in 1929. Ron was educated at Sydney Grammar School and claimed the most important thing he learned there was to take nothing for granted and to question everything - a lesson he applied throughout life.

Ron began work as a trainee mechanic but soon left to work at the Australian Gaslight Company. He studied at night over several years to qualify as a Chartered Accountant and Chartered Secretary, then went to work in the Administration of Sydney University. He retired to the Sunshine Coast in 1984, where he immediately became the Radio Operator for the newly re-formed Peregian Surf Life Saving Club.

Ron's interests were varied. In his younger days he was a keen ice skater and rally car driver racing Peugeots. One special interest was flying. He gained his private pilot's licence in 1959, and held a general aviation licence for 46 years. With a partner, he owned a Grumman Traveller aircraft. Sailing was another passion. He was joint owner of a 27 foot Colombia which he enjoyed sailing on Sydney Harbour.

Ron was also fascinated by radio. He studied with the Australian Radio College and in 1953 graduated as a Radio Service Engineer. He was then attracted to amateur radio and was first licensed in 1982. Morse code was a big challenge to Ron, but he persisted and in February 1990 was issued with his full call VK4ESC. He was an active member of the Sunshine Coast Amateur Radio Club as an Auditor and WIA Exams Invigilator.

Ron is survived by his wife Laurie.

Contributed by Ron Marschke VK4GZ

Are you managing the estate of a 'Silent key'?

Please save any QSLs for the National QSL collection, but first contact:

The Hon. Curator,
Ken Matchett VK3TL
on
(03) 9728 5350
or email
jeandawson@iinet.net.au

Rare DX, special call-signs prefixes and suffixes, pictorials and pre-war QSLs are needed.

Let us save something for the history of amateur radio.

ALARA *continued*

or not. Just add the extra to your booking or send it separately, for a ticket. If you wish to donate something to the Special Effort, you can bring or send it to Marilyn between now and September.

A piece for the astromony buffs among you

from the "New Scientist"

Round about end of the 19th century there was a change of staff at the Harvard University. The University had undertaken the task of photographing the whole of the visible night sky and of cataloguing the objects captured on film. It was tedious and time- consuming work. What is more the astronomers at the telescopes were amassing photographic plates faster then they could be examined.

In 1877 Edward Pickering the Director in a fit of exasperation told the young men engaged in the task that 'his housekeeper could do a better job than they could". So he actually sacked the young men and employed an equal number of young ladies, including his housekeeper, only to find that they really did do a better job than the young men.

The ladies were more meticulous and careful than the men and were less likely to be distracted. As well as this, the women worked for half the pay of the men, an added bonus.

The names of some of these women are known to astronomers and cosmologists to this day. The housekeeper, Williamina Fleming found 10 of the 24 novas then known. Annie Jump Cannon catalogued roughly 5000 stars per month, calculating their location, colour and brightness of each one. A major contribution to the star charts, which with only minor modifications are still in use today.

An interesting sideline is that Pickering coined the word 'computers' to describe the men and women who studied the photographic plates.

The women were not allowed to use the telescopes, of course. It was not considered to be suitable work for their delicate constitutions and it would not be suitable at all for men and women to be spending the long night hours together! Nevertheless the 'computers' made many insightful scientific conclusions, just from their study of the plates.

Henrietta Leavitt, another member of the team was actually considered for a Nobel Prize in 1923, and some years after her death Edwin Hubble used her identification of the cepheids (a group of stars which regularly brighten and fade in brightness) to prove that the universe was expanding.

Some remarkable women doing a job exceedingly well.

Late news received 12 April 2005

Margaret VK3DML, one of the early members of ALARA became an SK after a battle with cancer. Our sympathy goes out to her family and friends.

Correction to the April issue

The Special Event station for the Formula 1 Grand Prix held in Melbourne in March, as mentioned in last month's ALARA column, was run by the Eastern & Mountain District Radio Club. For the 10th consecutive year they used the callsign VI3GP, with QSLs going to the Club call of VK3ER.

Beyond our shores

David A. Pilley VK2AYD
davpil@midcoast.com.au

U.S.A.

Morse restructuring

It seems to be a long way off in the U.S.A.

The FCC continues to work toward developing a Notice of Proposed Rule Making (NPRM) that will spell out what the Commission has in mind with respect to possible changes in the current Morse code requirement and Amateur Radio licensing.

18 petitions have been filed. As far as the code issue is concerned, petitions--and comments in response to them--run the gamut from retaining or even beefing up the Morse requirement to eliminating it altogether. (The ARRL's proposal would retain the 5 WPM Morse examination for Amateur Extra class applicants only.) The League and others have also put forth proposals for a new entry-level Amateur Radio licence class.

The FCC appears unlikely to release an NPRM any sooner than mid-2005. Once public, the NPRM will initiate yet another round of public comments--this time on what the FCC has proposed. An FCC Report and Order to implement any new rules regarding Morse code and licence restructuring is unlikely before the second half of 2006, although it's possible the Commission could wrap up the proceeding before then.

(ARRL News)

Germany:

Changes in amateur regulations

Germany has recently announced changes in their Amateur Radio regulations. Some revisions stem from the outcome of World Radiocommunication Conference 2003, which essentially left it up to individual countries to decide if they wanted to continue to impose a Morse code requirement for HF access.

In Germany, the Deutscher Amateur Radio Club (DARC) reports that, effective February 19, there now are only two classes of amateur radio licence: Class A (formerly Class B and C) and Class E (formerly Class D). The new Class A works in accordance with the Harmonized Amateur Radio Examination Certificate (HAREC), T/R 61-02. It permits radio amateurs in participating European countries to go from one European nation to another and obtain a full licence.

Long time visitors or foreign residents with a CEPT licence in Germany will be issued a German Class A licence. The Class E licence remains limited to VHF/UHF frequencies only, with the addition of 10 GHz, output limited to 10 W EIRP. There also have been some changes to the spectrum allocation at 1.8 MHz. The text of the new regulations, in German, is available on the DARC Web site <http://www.darc.de/aktuell/afuv.pdf>.

(ARRL N/L 11/05)

Spain:

Changes to their licence

In Spain, the Unión De Radioaficionados Españoles (URE) reports two significant changes in that country's Amateur Radio regulations, effective March 3: Spain has deleted the Morse code requirement to obtain a Class A (General) or Class C (Novice) licence. Also, Class A (General) and Class B (Restricted) licensees now are allowed to use the band 50.0 to 51.0 MHz "under special and particular authorization."

(ARRL N/L 11/05)

Norway:

Gives hams limited 5 MHz access

Norwegian ham clubs will soon have limited access to the 5 MHz band.

Norway's Post and Telecommunications Authority has granted permission to Norwegian amateur radio club stations to operate on eight spot frequencies in the 5 MHz-band. This, for the period beginning April 1st of this year and running until December 31st of 2007.

According to reports, the operation will be fairly restricted. The permitted modes are upper sideband and CW, with a maximum transmitter power of 100 watts. The centre frequencies of the eight channels are 5.280, 5.290, 5.332, 5.348, 5.368, 5.373, 5.400 and 5.405 MHz, with the upper sideband 'dial frequency' being 1.5kHz lower in each case.

With this action Norway is added tothe growing list of nations offering their ham radio community at least a taste of operation at or near 5 MHz.

(ARNewsline)

Ham radio in space:

tracking Cubesats

Hams interested in space telemetry reception are invited to participate in a world-wide effort to support student groups that have designed and made CubeSats. These are satellites measuring 10 centimeters cubed and weighing less than 1 kilogram. A discussion group and a new website have been created to provide information on these educational CubeSats. They are at http://groups-beta.google.com/group/CubeSat and http://users.crosspaths.net/wallio/CubeSat.htm respectively.

(GB2RS)

ar

Correction

Captions for figures in Lloyd Butler's *X3* article in AR April 2005 pages 18–20

Unfortunately during the processing of this article the Figure captions got seperated from the rest of the text. They are printed below for completeness. Apologies to the author.

VK5UE Editor.

The captions should have been as follows:

Fig 1 - VK5BR X3 antenna tuning and matching system.

Fig 2 - The 80 metre X3 antenna

Fig 3a - VK5BR X3 antenna alternative 20 metre assembly.

Fig 3b - VK5BR X3 antenna alternative 20 metre assembly.

Fig 4 - 10 metre X3 antenna.

Fig 5 - Open coil - typical magnetic field.

Fig 6 - H field test device.

Ian Godsil VK3JS

Contest Calendar May - July 2005

May	7/8	ARI Intl. DX Contest	(CW/SSB/RTTY)
	14/15	CQ-M Intl. DX Contest	(CW/SSB)
	21	VK/trans-Tasman 80m Phone Contest	
	21/22	Baltic Contest	(CW/SSB)
	21/22	King of Spain Contest	(CW)
	28/29	CQ WW WPX Contest	(CW)
June	4	VK/trans-Tasman 80m CW Contest	
	11	ANARTS WW RTTY Contest	(Digi)
	11	Portugal Day DX Contest	(SSB)
	11/12	South America CW Contest	
	11	Asia-Pacific Sprint Contest	(SSB)
	18/19	All Asian DX Contest	(CW)
	25/26	Marconi Memorial HF Contest	(CW)
July	1	Canada day Contest (CW/SSB)	
	9	VK/trans-Tasman 160 Metres Phone Contest	
	9/10	IARU HF World Championship	(CW/SSB)
	16/17	CQ WW VHF Contest	(All modes)
	23	VK/trans-Tasman 160 Metres CW Contest	

Summer VHF-UHF Field Day 2005: Results

Contest manager: John Martin VK3KWA

In my report on last year's Field Day, I mentioned that the event is gaining support. The trend has continued this year, and the Summer Field Day seems to have established itself as the most popular VHF-UHF event of the year. But the activity is still quite uneven. VK3, VK4 and VK5 are continuing to grow, but the other call areas - especially VK2 - where are you? Time to make your mark and put those bushrangers, crow-eaters and banana benders in their place!

Thanks to the entrants who made helpful suggestions about the rules. One frequent comment is that the six hour sections are too short, and eight hours would be better. Also, it isn't easy for anyone who can only operate on the Sunday - you need to start horribly early to fit in even six hours. The answer could be to extend the finishing time by a few hours on Sunday afternoon. Stations in the 24 hour sections could still operate as they do now, or choose their best 24 hours for scoring purposes.

One request regarding logs. Please remember that I need all of the information requested on the cover sheet - and that includes separate totals for each band. Otherwise I have to re-score your log, which isn't much fun.

Congratulations to the winners of each section, and to all entrants, especially the new ones who all made very good scores. Here's hoping that I will have an even bigger pile of logs to sort through next time.

Call	Name	6m	2 m	70 cm	23 cm	12 cm	9 cm	6 cm	3 cm	TOTAL
Section A: Single Operator, 24 Hours										
VK3KAI	P. Freeman	32	432	620	768	320	320	320	770	3582
VK5ADE	S. Cameron	133	408	675	1048	-	-	-	-	2264
VK5MX	M. Millar	133	408	675	1048	-	-	-	-	2264
VK5AIM	S. Mahony	131	1161	665	40	-	-	-	-	1997
VK4OE	D. Friend	34	471	425	520	480	-	-	-	1930
VK3HY	G. Brain	104	621	720	288	-	-	-	-	1733
VK3AFW	R. Cook	90	630	645	-	-	-	-	-	1365
VK5OQ	K. Gooley	51	186	290	168	-	-	-	-	695

Section B: Single Operator, 6 Hours										
VK3KAI	P. Freeman	32	411	530	656	320	320	320	770	3359
VK3HV	G. Francis	44	294	340	528	-	-	-	320	1526
VK3YDK	K. Allan	45	228	300	456	-	-	-	320	1349
VK3UBM	M. Borthwick	21	195	325	-	540	-	-	-	1081
VK3YFL	B. Dunkley-Smith	43	336	450	-	-	-	-	-	829
VK4KZR	R. Preston	-	111	-	280	220	-	-	-	611
VK5OM	J. Bywaters	-	219	160	168	-	-	-	-	547
VK4DFG	H. Debnam	-	261	105	-	-	-	-	-	366
VK4EV	R. Everingham	54	171	105	-	-	-	-	-	330
VK3JS	I. Godsil	40	108	180	-	-	-	-	-	328
VK5AR	A. Raftery	22	93	120	56	-	-	-	-	291
VK5DC	D. Cavies	-	84	45	-	-	-	-	-	129
Section C: Multi Operator, 24 Hours										
VK3ATL	GARC (1)	105	603	920	856	730	210	210	340	3974
VK3PK	(2)	76	522	575	368	250	-	-	-	1791
VK5SR	SERG (3)	72	450	345	280	230	-	-	270	1607
VK3EG	EGARC (4)	27	390	585	496	-	-	-	-	1498
VK2AES	(5)	-	273	255	-	-	-	-	-	528
Section D: Multi Operator, 6 Hours										
VK3AWT	(6)	78	387	455	-	-	-	-	-	920
Section E: Home Station, 24 Hours										
VK3HZ	D. Smith	-	762	1000	720	-	-	-	-	2482
VK3UH	L. Mostert	63	501	580	600	-	-	-	-	1744
VK3CAT	A. Middleditch	61	189	310	-	-	-	-	-	560
VK3TRD	D. Rolfe	-	159	240	-	-	-	-	-	399
VK5FD	A. Dunn	35	108	175	-	-	-	-	-	318

(1) Geelong ARC: K. Jewell VK3AKK, C. Gnaccarini VK3PY, D. Learmonth VK3XLD

(2) L. de Vries VK3PK, D. Paterson VK3HPD

(3) South East Radio Group: C. Hutchesson VK5DK, C. Prime VK5XCP, T. Niven VK5NC, T. Aubrey VK5EE

(4) East Gippsland ARC: R. Ashlin VK3EK, D. Pendergast VK3DMP, P. McMahon VK3CGR, R. Donnan VK3HAP, N. Mifsud VK3DUT

(5) A. Sayers VK2AES, D. Hughes VK2DSH, R. Manning VK1JRM

(6) A. Tubb VK3AWT, J. Bramham VK3WWW

Ross Hull Memorial VHF-UHF Contest 2004 - 2005: Results

Contest manager: John Martin VK3KWA

This year there were major changes in the contest rules. The main section is now a four band VHF-UHF section, with the more specialised areas of Microwaves and Digital Modes now in separate sections. The aim of these changes was to make the contest more appealing to the many amateurs who don't have the scoring advantages of microwave or digital operators. The result would hopefully be more activity on bands like 2 metres and 70 cm. It was also hoped that the separate Microwave and Digital Modes sections would attract more logs from amateurs who prefer to concentrate their activity in these areas.

The result has been a small increase in the number of logs, but the big revival on bands like 2 metres still hasn't happened. But on the positive side, this year's contest attracted some new entrants, and the scores show that there are still plenty of contacts to be made.

Now to the results. In Section A we have a first-time winner. Congratulations to Len Mostert VK3UH. He has been a regular entrant for some years, and this year's win is well deserved. In the Microwave section, first place goes to George Francis VK3HV, followed closely by Peter Freeman VK3KAI. And in the Digital Modes section, Rex VK7MO has scooped the pool. Not a very big pool - more competition needed here - but this is an excellent result given Rex's location.

I also offered a special "Single Rig Award" for any station using a single radio for all bands, and running no more than 100 watts. This has been won by Ron Cook VK3AFW, who also came second overall in Section A. This proves it - you don't need big power to do very well in this contest. Please spread the word, and hopefully we'll see a lot more activity from medium-powered stations next year.

In Memoriam

Roger Steedman

VK3XRS

Record 6 time winner of the contest 1990 - 1995

Passed away October 2004

Ross Hull Contest 2004 - 2005

Call	Name	6 m	2 m	70 cm	23 cm	12 cm	9 cm	6 cm	3 cm	TOTAL
Section A: VHF-UHF (6m - 23cm)										
VK3UH	L. Mostert	168	990	680	520	-	-	-	-	2358
VK3AFW	R. Cook	44	978	535	-	-	-	-	-	1557
VK3HV	G. Francis	52	234	215	304	-	-	-	-	805
VK3KAI	P. Freeman	7	192	210	248	-	-	-	-	657
VK4CDI	P. Moat	-	405	215	-	-	-	-	-	620
VK2TG	R. Demkiw	66	315	210	-	-	-	-	-	591
VK3YFL	B. Dunkley-Smith	8	117	160	-	-	-	-	-	285
VK3HY	G. Brain	43	132	80	10	-	-	-	-	265
VK4KZR	R. Preston	-	33	35	40	-	-	-	-	108
VK7MO	R. Moncur	9	66	-	-	-	-	-	-	75
VK5FD	A. Dunn	11	18	25	-	-	-	-	-	54
VK2CZ	D. Burger	1	-	-	-	-	-	-	-	1
VK4TGL	G. Lawler	Check log								
Section B: Microwaves (23cm and above)										
VK3HV	G. Francis	-	-	-	304	-	-	-	20	324
VK3KAI	P. Freeman	-	-	-	248	10	10	10	40	318
VK4KZR	R. Preston	-	-	-	40	20	-	-	-	60
Section C: Digital modes, All Bands										
VK7MO	R. Moncur	-	1560	-	-	-	-	-	-	1560

Ross Hull Contest: List of Winners, 1950 - 2005

1950 - 1951	VK5QR	R. Galle	1978 - 1979	VK4DO	H. L. Hobler
1951 - 1952	VK5BC	H. Lloyd	1979 - 1980	VK3ATN	T. R. Naughton
1952 - 1953	VK4KK	A. K. Bradford	1980 - 1981	VK6KZ	W. J. Howse
1953 - 1954	VK6BO	R. J. Everingham	1981 - 1982	VK6KZ	W. J. Howse
1954 - 1955	VK4NG	R. Greenwood	1982 - 1983	VK6KZ	W. J. Howse
1955 - 1956	VK3GM	G. McCullough	1983 - 1984	VK6KZ	W. J. Howse
1956 - 1957	VK3ALZ	I. F. Berwick	1984 - 1985	VK3ZBJ	G. L. C. Jenkins
1957 - 1958	VK3ALZ	I. F. Berwick	1985 - 1986	VK3ZBJ	G. L. C. Jenkins
1958 - 1959	VK3ALZ	I. F. Berwick	1986 - 1987	VK3ZBJ	G. L. C. Jenkins
1959 - 1960	VK4ZAX	D. R. Horgan	1987 - 1988	VK5NC	T. D. Niven
1960 - 1961	VK3ARZ	W. Roper	1988 - 1989	VK5NC	T. D. Niven
1961 - 1962	VK5ZDR	M. J. McMahon	1989 - 1990	VK3XRS	R. K. W. Steedman
1962 - 1963	VK4ZAX	D. R. Horgan	1990 - 1991	VK3XRS	R. K. W. Steedman
1963 - 1964	VK5ZDR	M. J. McMahon	1991 - 1992	VK3XRS	R. K. W. Steedman
1964 - 1965	VK3ZER	R. W. Wilkinson	1992 - 1993	VK3XRS	R. K. W. Steedman
1965 - 1966	VK3ZDM	J. R. Beames	1993 - 1994	VK3XRS	R. K. W. Steedman
1966 - 1967	VK5HP	J. H. Lehmann	1994 - 1995	VK3XRS	R. K. W. Steedman
1967 - 1968	VK3ZER	R. W. Wilkinson	1995 - 1996	VK2FZ/4	A. Pollock
1968 - 1969	VK5ZKR	C. M. Hutchesson	1996 - 1997	VK2FZ/4	A. Pollock
1969 - 1970	VK3ZER	R. W. Wilkinson	1997 - 1998	VK2FZ/4	A. Pollock
1970 - 1971	VK4ZFB	E. F. Blanch	1998 - 1999	VK3XPD	A. P. Devlin
1971 - 1972	VK5SU	J. W. K. Adams	1999 - 2000	VK3EK	R. G. Ashlin
1972 - 1973	VK5SU	J. W. K. Adams	2000 - 2001	VK4TZL	G. R. McNeil
1973 - 1974	VK5SU	J. W. K. Adams	2001 - 2002	VK4TZL	G. R. McNeil
1974 - 1975	VK5SU	J. W. K. Adams	2002 - 2003	VK3EK	R. G. Ashlin
1975 - 1976	VK5SU	J. W. K. Adams	2003 - 2004	VK3EK	R. G. Ashlin
1976 - 1977	VK4DO	H. L. Hobler	2004 - 2005	VK3UH	L. Mostert
1977 - 1978	VK3OT	S. R. Gregory			

Gridsquare Standings at 21 March 2005

144 MHz Terrestrial

VK2FLR	Mike	113
VK3FMD	Charlie	103
VK2KU	Guy	102
VK2ZAB	Gordon	78 SSB
VK3KAI	Peter	78
VK2KU	Guy	69 SSB
VK3CY	Des	68
VK3PY	Chas	68 SSB
VK3HZ	David	64
VK2DVZ	Ross	62 SSB
VK2TK	John	62
VK3EK	Rob	62 SSB
VK3XLD	David	55 SSB
VK2EI	Neil	54
VK3TMP	Max	53
VK3BJM	Barry	51 SSB
VK3ZLS	Les	51 SSB
VK3BDL	Mike	50
VK7MO	Rex	48
VK2DXE	Alan	47
VK2KU	Guy	47 Digi
VK3KAI	Peter	47 SSB
VK3WRE	Ralph	46 SSB
VK2DXE	Alan	43 SSB
VK3CAT	Tony	40
VK3KEG	Trevor	39
VK4TZL	Glenn	38
VK2TK	John	35 SSB
VK3KAI	Peter	35 Digi
VK4KZR	Rod	35
VK3ZUX	Denis	33 SSB
VK6HK	Don	33
VK3ZYC	Jim	31
VK7MO	Rex	30 SSB
VK4CDI	Phil	29
VK3KME	Chris	28 SSB
VK4CDI	Phil	28 SSB
VK2KRR	Leigh	27 FM
VK2TK	John	27 Digi
VK4DFE	Chris	26 SSB
VK3BBB	Brian	25
VK7MO	Rex	25 Digi
VK2TG	Bob	24 SSB
VK3YB	Phil	23
VK5ACY	Bill	23 SSB
VK2EAH	Andy	22
VK3HV	George	21 SSB
VK3TLW	Mark	20 SSB
VK6KZ	Wally	20
VK3AL	Alan	18 SSB
VK6KZ/p	Wally	16
VK3ZYC	Jim	14 SSB
VK2EAH	Andy	13 SSB
VK3DMW	Ken	13
VK2CZ	David	12
VK7ZSJ	Steve	12
VK2EI	Neil	11 Digi
VK2DXE/p	Alan	10
VK3ANP	David	10
VK3BG	Ed	10
VK2EAH	Andy	9 Digi
VK6HK	Don	6 Digi
VK2TWO	Andrew	5
VK3ZDR	David	5 SSB
VK2AKR	Neil	3 Digi
VK2DXE	Alan	3 Digi
VK4TJ	John	3 SSB
VK6DXI	Mirek	3 FM
VK2AKR	Neil	1 SSB
VK3XLD	David	1 Digi
VK4CDI	Phil	1 Digi

144 MHz EME

VK2KU	Guy	112
VK2FLR	Mike	110
VK7MO	Rex	106 Digi
VK3CY	Des	70
VK2KRR	Leigh	24
VK3HZ	David	11
VK4CDI	Phil	5
VK3KEG	Trevor	4
VK3FMD	Charlie	3
VK2DVZ	Ross	2
VK2DXE	Alan	2

432 MHz Terrestrial

VK2ZAB	Gordon	57 SSB
VK3PY	Chas	50 SSB
VK3FMD	Charlie	47
VK3XLD	David	47 SSB
VK3ZLS	Les	40 SSB
VK2KU	Guy	38
VK2KU	Guy	34 SSB
VK3EK	Rob	34 SSB
VK3HZ	David	34
VK3CY	Des	32
VK2DVZ	Ross	31 SSB
VK3BJM	Barry	31 SSB
VK3KAI	Peter	29
VK3KAI	Peter	28 SSB
VK3BDL	Mike	26
VK3WRE	Ralph	26 SSB
VK3TMP	Max	25
VK3KEG	Trevor	21
VK2TK	John	18
VK2TK	John	17 SSB
VK7MO	Rex	17
VK3ZUX	Denis	15 SSB
VK3CAT	Tony	14
VK4KZR	Rod	14
VK3TLW	Mark	13 SSB
VK6KZ	Wally	13
VK2KRR	Leigh	11 FM
VK4TZL	Glenn	11
VK3AL	Alan	10 SSB
VK3ANP	David	10
VK3BG	Ed	10 SSB
VK3YB	Phil	10
VK2TG	Bob	9 SSB
VK3BBB	Brian	9
VK4DFE	Chris	9 SSB
VK3KME	Chris	8 SSB
VK4CDI	Phil	8
VK6KZ/p	Wally	8
VK2FLR	Mike	6
VK7MO	Rex	6 Digi
VK2KU	Guy	5 Digi
VK3HV	George	5 SSB
VK3KAI	Peter	4 Digi
VK3PY	Chas	4 Digi
VK3XLD	David	4 Digi
VK3ZYC	Jim	4 SSB
VK2CZ	David	3
VK2TWO	Andrew	3
VK6DXI	Mirek	3
VK2DXE/p	Alan	2
VK4TJ	John	2 SSB
VK2AKR	Neil	1 SSB
VK2TK	John	1 Digi
VK3DMW	Ken	1

432 MHz EME

VK4KAZ	Allan	14 CW
VK3FMD	Charlie	5
VK3HZ	David	3
VK7MO	Rex	1

1296 MHz

VK3XLD	David	35 SSB
VK3PY	Chas	34 SSB
VK3FMD	Charlie	32
VK2ZAB	Gordon	29 SSB
VK3ZLS	Les	26 SSB
VK2KU	Guy	25
VK2KU	Guy	22 SSB
VK3EK	Rob	20 SSB
VK3KWA	John	19
VK3KAI	Peter	17
VK2DVZ	Ross	16 SSB
VK3KAI	Peter	16 SSB
VK3WRE	Ralph	16 SSB
VK3BDL	Mike	12
VK3BJM	Barry	12 SSB
VK3TMP	Max	11
VK2TK	John	10 SSB
VK3HZ	David	10
VK4KZR	Rod	10
VK7MO	Rex	10
VK3TLW	Mark	8 SSB
VK3AL	Alan	7 SSB
VK2CZ	David	5
VK3HV	George	5 SSB
VK3ZUX	Denis	5 SSB
VK3ZYC	Jim	5
VK6KZ/p	Wally	5
VK3BG	Ed	4 SSB
VK3BVP	Shane	4
VK3YB	Phil	4
VK3ZYC	Jim	4 SSB
VK6KZ	Wally	4
VK2KU	Guy	3 Digi
VK3BBB	Brian	3
VK3KEG	Trevor	3
VK2DXE/p	Alan	2
VK2FLR	Mike	2
VK3CY	Des	2
VK3KAI	Peter	2 Digi
VK3KME	Chris	2 SSB
VK3XLD	David	2 Digi
VK4TJ	John	2 SSB
VK6DXI	Mirek	2
VK3DMW	Ken	1
VK3ZYC	Jim	1 Digi
VK4TZL	Glenn	1
VK7MO	Rex	1 Digi

2.4 GHz

VK3PY	Chas	11 SSB
VK3XLD	David	11 SSB
VK3WRE	Ralph	9 SSB
VK3FMD	Charlie	8
VK3KAI	Peter	7 SSB
VK3EK	Rob	5 SSB
VK3HV	George	4 SSB
VK6KZ	Wally	4
VK3BJM	Barry	3 SSB
VK3HZ	David	2
VK3KAI	Peter	2 Digi
VK4KZR	Rod	2
VK3BG	Ed	1 SSB
VK3TLW	Mark	1 SSB
VK3ZUX	Denis	1 SSB
VK4TZL	Glenn	1

3.4 GHz

VK3FMD	Charlie	8
VK3WRE	Ralph	6 SSB
VK3KAI	Peter	5 SSB
VK3HV	George	4 SSB
VK3XLD	David	4 SSB
VK6KZ	Wally	4
VK3EK	Rob	3 SSB

5.7 GHz

VK3FMD	Charlie	10
VK3WRE	Ralph	9 SSB
VK3KAI	Peter	7 SSB
VK3XLD	David	5 SSB
VK6KZ	Wally	4
VK3BJM	Barry	2 SSB
VK3EK	Rob	2
VK3HV	George	2 SSB
VK6BHT	Neil	2 SSB
VK3KAI	Peter	1 Digi
VK3ZUX	Denis	1 SSB

10 GHz

VK3FMD	Charlie	9
VK6BHT	Neil	9 SSB
VK3WRE	Ralph	8 SSB
VK3XLD	David	8 SSB
VK3KAI	Peter	7 SSB
VK3EK	Rob	5 SSB
VK6KZ	Wally	5
VK3HV	George	4 SSB
VK3PY	Chas	4 SSB
VK3TLW	Mark	3 SSB
VK3ZYC	Jim	3 SSB
VK2EI	Neil	2 SSB
VK3BJM	Barry	2 SSB
VK3ZUX	Denis	2 SSB
VK7MO	Rex	2
VK3BG	Ed	1 SSB
VK4KZR	Rod	1
VK4TZL	Glenn	1

24 GHz

VK6BHT	Neil	3 SSB
VK2EI	Neil	2 SSB
VK3FMD	Charlie	2
VK6KZ	Wally	2

474 THz

VK7MO	Rex	1

Additions, updates and requests for the guidelines to Guy VK2KU, vk2ku@tsn.cc, or by mail (QTHR 2005).

The guidelines (and the latest League Table) are also available on the website of the NSW VHF Dx Group at www.vhfdx.radiocorner.net - click on Gridsquares.

Next update of this table will be in early July 2005.

Stations who do not confirm their status for more than 12 months may be dropped from the table.

ar

Guy Fletcher VK2KU

Bill Magnusson VK3JT

New-look AMSAT-NA website

The worldwide amateur radio satellite fraternity is fortunate indeed to have the volunteer services of people like Emily Clarke W0EEC.

Emily has only been into amateur radio for a short time but quickly discovered amateur radio satellites and immediately volunteered to revamp the AMSAT-NA website.

If you haven't visited the site for a while you really should do so. It's been totally worked over in what must have been a very time consuming exercise for Emily and her team of beta testers. The new format is comprehensive and easy to navigate. You will find sections on every aspect of AMSAT activities and links to other sites of interest to satellite enthusiasts.

The really great thing is that Emily regularly monitors and contributes to the AMSAT-BB so feedback on changes to the site was always forthcoming during the re-build exercise. The result is there for all to see and has generally been hailed as a welcome change for the better and in keeping with best practice. Thanks Emily.

SSETI-Express news

No, this has nothing to do with the search for extraterrestrial intelligence. That's SETI. The SSETI Express (Student Space Exploration and Technology Initiative - Express) mission is an educational mission.

It will deploy CUBESAT pico-satellites developed by various universities. These pico-satellites will take pictures of Earth and act as a test-bed and technology demonstration for hardware devices related to the complementary project, the European Student Earth Orbiter.

Three cubesats will be part of this first SSETI Express exercise. They will be deployed from a specially designed launcher carried aboard a Kosmos-3M launch vehicle fired from the Pletsesk Cosmodrome sometime this year.

The 3 pico-satellites are "XI-V" from Japan, University of Tokyo, "UWE 1" from Germany, University of Würzburg and "Ncube 2" from Norway, Andoya Rocket Range.

AMSAT-UK Chairman Martin Sweeting, G3YJO, announced last year that an Amateur Radio transponder will be part of the SSETI Express satellite. Onboard will be a 2.4 GHz transmitter and a 437 MHz receiver. The pair will be commissioned as an amateur FM voice transponder after the transmitter serves initial telemetry duty.

The transmitter was built by Sam Jewell, G4DDK, David Bowman, G0MRF, and Jason Flynn, G7OLD. The team also developed the switch-mode power supply and control interfaces with assistance from Graham Shirville, G3VZV. Charles Suckling, G3WDG, has completed the 3 W 2.4 GHz power amplifier, which is identical to the one flying in the recently launched AO-51 "Echo" spacecraft.

The receiver will be supplied by Holger Eckart, DF2FQ. The final testing stage of this project has now been reached and we can expect a launch some time soon.

Only time will tell when the transponder will be activated so keep your eyes on the AMSAT web sites for news of this exciting project.

April AR has pictures on the inside back cover and some other info on page 39.

AO-51 changes

Mike Kingery, KE4AZN sent this report on behalf of the Echo Command Team. If you are an Echo fan you will have caught up with these changes already but here they are for the benefit of those thinking about having a go.

"All required software is loaded back up on AO-51 and running. The FM repeater and the PBBS will be turned back on for user activity immediately. One item that is being tested is the PBBS call sign. You will need to change your Wisp or PB setup for AO-51 to reflect the change in the call sign. Replace PACB-11 and PACB-12 with PECHO-11 and PECHO-12. P for PacSat, and ECHO for, well, I hope you can figure that one out".

Those changes were signalled in mid-March. If you are interested in starting to operate with Echo I'd suggest the best way to "bone-up" is to visit the AMSAT-NA web site. There is a front page section devoted to the latest comings and goings on Echo. It expands into a complete description of the entire project. Even at this stage many features on this satellite are still being commissioned and the scene can change from week to week. The web-site reference source is invaluable.

This satellite is shaping up to be an experimenter's delight. Thanks go to Mike and his team.

The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for breaking news and such things as software releases. Contact Graham if you wish to be placed on the mailing list.

AMSAT-Australia Echolink Net

The net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0600UTC and you can join in by connecting to the AMSAT conference server.

All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034

Graham's e-mail address is:
vk5agr@amsat.org

The old rules don't change

This submission deals with something that has not been a real problem here but is evidently endemic in some parts of the world. Maybe it's because we are better mannered or perhaps it's because there aren't as many of us. Whatever the reason it's worth a mention here because there are always newcomers to the field and they should be looking for guidelines.

I refer to the dubious practice of calling for contacts via the satellites when you can't hear the satellite signal! Common sense would deem this to be a fruitless exercise but there doesn't seem to be a website for common sense. Instances have been reported of people calling repeatedly even when the satellite is not in their sky. That particular practice says more about their basic understanding of what's going on rather than manners. Of course it's fruitless to call when the satellite isn't in your area. If you don't

Spotlight on SWLing

Robin Harwood VK7RH

Farewell to one station and two prominent people

The Antigua broadcasting relay station, jointly operated by the BBC and DW, was closed down on Sunday March 27th. The site is now up for sale.

Many Australasian listeners to the German Service relied on this strong signal on 11795 in the early local evening. The BBC did not specifically target this region from there, mainly concentrating on North, Central and South America. Following the closure of Antigua, both organisations have commenced using the Bonaire facilities of Radio Netherlands, plus the French Guyana relay of Radio France International. For example DW German service, between 0200 and 0600 on 9735 now alternates between the two sites. The broadcast to the South Pacific from 0600 now comes direct from Germany.

Coincidentally, the BBC External Services also chose this date to significantly reduce its shortwave output to South America and Europe. Broadcasts will now be in the morning and evening period instead of being almost around the clock. The DW cutbacks have not been as severe as first thought, with the relays via Siberia continuing on 7430 and 9900 in German. However the audio does not seem as clear as previously.

I also notice the BBC relay from Thailand on 7105 from 2200, now clashes with DW in an Eastern European language. The BBC W/S Singapore relay on 9740 in our local evenings, used to be another clear channel but another Asian station has appeared and I cannot yet determine who it is. It probably is from China.

The death of Pope John Paul II on Saturday April 9th was extensively covered by the majority of international stations and subsequently influenced programming, particularly from European stations. I expect that this coverage will continue, up to the election by the Conclave of the new Pontiff. There were so many stations broadcasting the funeral service live on the 8th at 0800 and the audio delay, caused by many satellite hops, was particularly noticeable.

I also noted in March, the death of Dr. Gene Scott. He has been broadcasting on shortwave around the clock via WWCR, from the CIS and from the Caribbean island of Anguilla. However you would not know this as they are continuing to broadcast taped repeats of his "sermons". I am hearing them on 13845 at 2200 via WWCR in Nashville.

I should be in a position shortly to recommence medium wave Dxing, following a recent decision on the ABA for Launceston's three AM stations to move to FM. I have a 5 kW sender pretty close by on 1008 and will thankfully no longer have spurs. 18 months has been given for this changeover. The FM band in this region is becoming crowded. I expect that this coverage will continue, up to the election by the Conclave of the new Pontiff.

Well that is all for this month. Keep listening and 73- de VK7RH

ar

AMSAT *continued*

know where it is then it could be on the other side of the world. That's just a matter of becoming familiar with some basic geometry and having faith in a tracking system.

The practice of calling even when you can't hear a signal runs deeper than that. It may just be a case of over-enthusiasm in a newcomer but more likely it will be because the operator hasn't paid enough attention to their receiving station. Even going back to the 1940s and 50s there was a saying, "If you can't hear 'em, you can't work 'em". In those days everyone built their own gear and the amateur's first project was always a good receiver. Nowadays the basic station unit is a commercial transceiver of some sort so that shouldn't be a problem.

Many people start off in amateur radio satellites still not realising that we are dealing with quite weak signals. Sometimes just a few milliwatts to begin with and often from distances of several thousand kilometres.

If you are serious about this endeavour you had better pay serious attention to your entire receive chain. You will hear stories - and this is part of the problem - of being able to work this or that satellite with a hand-held transceiver and rubber duckie. This may well be true under ideal circumstances. I've done it myself. But you can't rely on such a simple station to give good results all the time on all the satellites and invariably the operator will end up not being able to hear the satellite signal. This is when the above situation can arise. The operator can't hear the satellite but decides to "have a go anyway". The result is unnecessary QRM and no hope of a contact.

There are plenty of good texts available for beginners. Martin Davidoff's "The Radio Amateur's Satellite Handbook", published by ARRL is still the one to go for if you are thinking of getting into satellites. The AMSAT-NA web-site has an excellent beginner's section. All the above points are covered in detail in those and other publications. They are all written by experienced amateurs who have "been there and done that". Why re-invent the wheel.

ARISS alive and well

Tony VK5ZAI advises that a new round of school contacts is being organised for the expedition-11 crew on the ISS.

In recent times the "tele-bridge" technique has been used with great success. The use of Internet connections has freed up the school contact scheme from one of its original great drawbacks, timing. Going back to the days of MIR, school contacts were organised on the basis of the spacecraft being within radio range of the school or group at the time of the contact. Great if it can be organised but suitable passes cannot be ordered in advance and passes in school hours - or even reasonable hours - happen only occasionally.

This round however Tony hopes to include a live contact with an Australian school. Keep your eye on the ARISS website for late breaking details. It's hoped to take place between May and July and the ISS side of the contact will be available directly on 2 metres over most of Australia. The school side will be carried as usual on Echolink using the AMSAT or EDU_NET conference servers.

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VHF/UHF – an expanding world

David Smith VK3HZ
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Leigh Rainbird VK2KRR
vk2krr@telstra.com

Weak Signal

David Smith VK3HZ

There have been a few good openings during the month, but things are starting to drop off now. It might soon be time to pull down the antennas for a bit of a brush-up, to be ready for next season.

In the south of the country, there have been some great openings on 144 MHz and above between Adelaide and Albany. During the week of 19-26 March, several stations including VK5's USB, RO, ZBK, and UBC, and worked Wally VK6WG on 2 m and 70 cm. VK5's AKK and ZLX worked him on 2 m only. Steve VK5ZBK also worked Wally on 23 cm. Wally was hearing the Adelaide 23 cm beacon at the time. Brian VK5UBC also worked Frank VK6DM and Bob VK6BE, both on 2 m. On the evening of 22/3, the opening extended to Mt Gambier with Wally working Colin VK5DK on both 2 m and 70 cm.

On the morning of 1/4, the bands opened between Melbourne and Adelaide. The 2 m, 70 cm and 23 cm beacons on Mt Lofty were audible in Melbourne well into the morning. VK3's HZ and AFW were at the Melbourne end and worked VK5's UBC, USB, JL, ZK, ATW and VK3LY on 2m. VK3HZ also worked VK5UBC on 70cm.

On the evening of 2/4, Ross VK2DVZ reports working Nick ZL1IU on 2m. It was a difficult QSO with heavy QSB and very late in the season for such an opening.

VK0MT Macquarie Island Activity

Further to last month's report, and as reported below in the Digital DX Modes section, Dave VK0MT on Macquarie Island also managed to work three VK3 stations on 2 m FSK441 Meteor Scatter. The last time VK0 was worked from VK3 on 2 m was in late 1986 during a Sporadic E opening. Using digital modes, it is now possible, from VK3 at least, to work all VK call areas on 2 m at any time, provided that someone is active at the other end, of course! The VK3 stations that worked VK0MT all completed the requirements for the WAVKCA award. Thanks must go to Rex VK7MO who ably assisted in this by activating VK9 and being instrumental in the activation of VK0.

VK/ZL Propagation Logger

Adam VK4CP reports that the VK/ZL Logger has a new (permanent) home at: www.vklogger.com. Hopefully this URL will be very easy to remember. The logger is being hosted on a new server that should be much more reliable than in the past.

Unfortunately, following a crash on the old server, all of the Operator Info and Grid Squares tally data was lost. If you were registered there before, or if you're an active VHF/UHF operator, please enter your information on the new site for the benefit of others.

A new feature with this reincarnation is the Discussion Forums: www.vklogger.com/forum/ where ongoing discussions can take place in an organised manner. A number of forums and sub-categories have been set up to begin with, but Adam would welcome any suggestions on how these could be renamed or organised to best suit you. Adam can be contacted at ham@vk4cp.com.

EME

Congratulations to Alan VK3XPD who recently achieved his first 10 GHz EME contact during the DUBUS EME contest, working Jim WA7CJO on 10.368.1 MHz CW. An attempt to make contact using SSB was thwarted by the moon descending behind the trees at Jim's end.

Alan is located in suburban Melbourne and is running 75 Watts into a 3 m dish, with frequency locked to GPS. He has made significant improvements to the system recently and now has 12.5 dB of Sun Noise and circa 0.9 dB of Moon noise - close to the optimum, although still slightly down on Sun Noise. Alan reports that the major shortcoming now is his CW ability (or lack thereof).

Going even higher in frequency, on 16/4, the first EME contact on 47 GHz was achieved by the team of AD6FP, W5LUA and VE4MA at one end and RW3BP at the other.

RW3BP is running 100+ watts to a 2.4 m dish, while the others are running 30 watt TWTs to 1.8 and 2.4 m dishes. The RW3BP setup equates to a staggering 77+ megawatts EIRP. Noise figures of all stations are in the 3.5 to 4.7 dB range.

Since the Doppler shift can be as much as 100 kHz at 47 GHz, one must continuously adjust the receive frequency to keep the station centred in the passband. Precision frequency control was obtained by using GPS controlled, Rubidium locked, or TV sync controlled phase locked local oscillators.

Beacons

The VK5RSE 144.550 MHz beacon on Mt Graham, 40 km NW of Mt Gambier, has had some much-needed refurbishment work carried out by the South East Radio Group over the last month, after it was found to be only putting out 1.5 watts into antennas that were looking rather second hand. It is now running 25 watts into 4 new DL6WU-style 5-element yagis, pointing east, west, northeast and northwest. Signal reports are requested to Colin VK5DK at vk5dk@internode.on.net.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Trans-Tasman Contest

(See April AR page 42 for details)

80 m

Phone: May 21st,
CW: June 4th

160 m

Phone: July 9th
CW: July 23rd

The Magic Band – 6 m DX

Brian Cleland – VK5UBC

Summary of the Australian DX season

Another 6 m DX summer season has come and gone. In VK5 the band started to come to life in early November with the first opening occurring on the 8th November 2004 into the Brisbane area of VK4, with Jeff VK8GF at Alice Springs also worked. From this point on the band was open to some part of Australia from VK5 with either stations worked or beacons heard on most days until late February 2005. It is noticeable though that once the Christmas holiday period was over the number of active stations decreased, but openings were still prevalent with the band being open from VK5 to VK4 for long periods on many days in February. Wayne VK4WS became a regular in February with S9+ signals on many days.

As an indicator of activity, below is a summary table of interstate stations worked at my home QTH of Gawler (PF95jj):

Call Signs	Contacts	Worked
VK1	1	2
VK2	37	90
VK3	5	11
VK4	39	113
VK6	13	35
VK7	10	19
VK8	1	3 (VK8GF)
VK9	1	3 (VK9NS 18/12/04)
TOTAL	**107**	**276**

Silent keys

reported to NSW in April.

We are sad to announce the passing of:

Ray Milliken VK2SRM of Raymond Terrace

Tom Davis VK2STD of Raymond Terrace

Geoff Robinson VK2BGR of Barraba

Our sincere condolences to the families and friends of these amateurs

It should be noted I had several other contacts (approx 100) from my portable QTH Corny Point (PF85mc) but that log is not computerised and has not been included in the above table.

I think the table above indicates that VK6 activity is poor and on many occasions the Perth beacon was S9 but there were no stations to work. VK3 activity may seem low but it must be realized that it is short skip from this QTH and there are not a lot of openings. I also think that there were very few regularly active stations from VK5.

On many days all states were worked and Christmas and Boxing days were exceptional if you could drag yourself away from the turkey and pudding.

International DX

From an international point of view, I can only report on what I heard or worked. In summary I managed to work 2 x KH6 stations on the 9 Nov 2004. JA's were also worked on the 21st Nov 04, 11th Feb and 7th March 05 with the best opening being the 11th Feb when 11 x JA stations in 5 call areas were worked. Frustratingly the FK8 beacon could be heard on many occasions but only twice were stations available to be contacted. On the 30th Nov FK8GX was worked and on Xmas morning FK8HA was into SA and Queensland causing a large pile up. New Zealand stations were worked on many occasions with very strong signals (up to S9+20). In total 15 different stations were contacted with a total of 32 contacts on 10 different occasions.

Peter VK6KXW reports: "I can ruefully say 'What DX?'" It's been shocking on 6 m into Perth. Even Graham VK6RO has been conspicuous by his absence. So looking at my log book:

31/10/04 - JA5CMO 5/7

8/11/04 - VK6JR (Wayne - Margaret River) heard me 4x2 backscatter on AU he was also hearing VK6RPH/b with a lot of buzz on signal.

Christmas period Nov/Dec - VKs 2,3,4,5,7,8 worked with a lot of effort!

24/12/04 - ZL2AAA Morie 4x3 was the high light of the season.

7/2/05 - VK4AFL 4x1, VK4WS 4x2 was the last DX contact I had.

This March/April TEP has seen the usual 48/49 video coming in along with Skymet genesis software meteor radar at Learmouth solar observatory – 1050 km north of Perth, 6kw pep, 1 or 2 el yagis illuminate the sky centred on 35.250 MHz wideband.

This info is via Dr Tony Mann to whom I give credit and the very excellent professional email newsletter of the ICDX Yahoo group at http://groups.yahoo.com/group/icdx/.

Joe VK7JG reports: "Sorry there have been no 6 m happenings in VK7 for the past two months. I monitor 50.11 whenever I am in the workshop. January had some good openings to VK4 but that is too far back. On the 21st Jan I worked you and VK6ZKO.

9th Feb worked VK4WS and YRS, 15th worked VK4WS again Sporadic E.

23rd Feb Tropo opening VK3YDK.

24th Feb. VK4TWR, I was his first VK7 on 6m and VK4JOO . That was the last time 6m was open into VK7.

Wayne VK4WS (Brisbane) reports a very different story. On 7/2, VK6KXW and VK6JR. On 25/2 DS4EOI. On 10/3 6K2DHP (Korea). And between mid February and mid March, a total of 238 JA contacts.

Thanks Wayne – oh to live a little further north. Wayne's report did not include his usual interstate openings (VK2, 3 and 5). I'm also aware that there have been many good international openings to Japan, China, and Korea etc, from FNQ. I hope to be able to get more info for future notes.

Another good opening from JA to VK4 (Brisbane) on the 13 April. Wayne VK4WS reports working 13 JA's in 6 call areas with the JA beacons being audible for hours.

Richard VK5USB worked VK4WS, AFL and YRS on 29th March.

At my QTH the Alice Springs beacon was up to S9 on the morning of the 15 April.

Please remember to send any 6 m DX information to Brian VK5UBC at bcleland@picknowl.com.au. I can only report what I know.

Digital DX Modes

Rex Moncur – VK7MO

Dave, VK0MT, has completed his period at Macquarie Island with 2 metre, JT65b, EME contacts to W5UN, KB8RQ, DF7KF, RN6BN, HB9Q, KJ9I, N5BLZ and VK7MO using his small 2.3 WL yagi and 100 watts. On 2 metres meteor scatter using FSK441a, he completed with VK7MO, VK7JG, VK3KAI, VK3HZ and VK3FMD. Each of the VK3s who worked him went portable to gain the extra elevation to achieve these contacts at around 2000 km - well done to Peter, Dave and Charlie. The longest distance was to Charlie, VK3FMD, at 2122 km. Dave also worked Bob ZL3TY on meteor scatter for what is though to be the first ZL to VK0 contact on 2 m.

Welcome to Trevor, VK4AFL, and Wayne, VK4WS, in Brisbane and also Bill, VK4KHZ, at Glenden, west of Mackay, who are now operational on 2 metres FSK441. Trevor has worked into Hobart and Wayne has copied VK3s and VK7 and been copied by Peter, VK3KAI.

Tests have been conducted to compare FSK441a and FSK441b. The basis of the tests is that it is possible to construct a message "##" that when transmitted in FSK441b will also decode in FSK441a as "#SX". Pings can then be recorded and played back in both modes and the numbers of correct characters counted to compare the modes. The results indicate that on 2 metres there is very little between the two modes although FSK441a appears to have an advantage below 1000 kms and FSK441b is marginally in front for distances above 1000 km. Given that there is little difference between the modes it has been decided to continue present arrangement for activity sessions with FSK441a on Saturdays and FSK441b on Sundays.

Please send any Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

2 m and 70 cm FM DX

Leigh Rainbird - VK2KRR

A mixed bag of conditions for March, good in some areas but remaining poor for most others.

In a continuation of the good conditions experienced during the end of February, the first few days of March were quite good in the south east.

The 2nd of March saw a few FM DX signals about. Brian VK5UBC at Gawler had a good run working VK2KRR 5/5 and Ray VK3RW 5/7. Ray was using a Diamond vertical for the 710 km contact. Brian was able to get to a large number of interstate 2 m repeaters, which included Geelong, Mt Baw Baw, Yarrawonga, Wagga and a big trip to the Canberra Mt Ginini repeater at 920 km.

Following on the next morning 03/03, John VK5PO at Eden Valley was working the Canberra repeater at 884 km.

14/03 John VK3HJW reports working VK5UBC at Corny Point via the Otway Ranges repeater 147.275. John also notes that Brian later worked the Mt Barrow, Tasmania repeater 147.000 which would be over 1000 km for Brian, probably 400 km or so for John.

Beginning on 20/03 and ending around 22/03 an opening occurred to the VK6 south coast from the Adelaide area. Frank VK6DM at Albany worked VK5UBC at Gawler with rather weak signals 146.500 at 1919 km. Frank also managed to work some Adelaide area repeaters such as Houghton 146.850 and also Crafers 147.000 in the 1900 km area. Brian then worked Frank and also Bob VK6BE via the Albany repeater 146.725.

Up in north Queensland, Mike VK4MIK reports the bands have been rather quiet, only occasional openings into the Townsville repeater being heard from up near Cairns. On 22/03 Mike worked to the Mackay repeater at S6 signal strength, were he worked Felix VK4FUQ from Ingham, 525 km to the repeater for Mike. Mike worked as far as the Hodgson Range repeater 146.925 in the central highlands at 640 km to his south. Also to the Hayman Island repeater at 451 km. Mike was unable to raise anyone for a QSO on the latter two.

29/03, Hayden VK7HAY went on a trip to Mt Barrow from Hobart. Being a keen new operator, it was pleasing to see that Hayden took along his handheld rig and worked some DX right across the waters of Bass Strait to Victoria's Mt Baw Baw repeater on 147.225. This is around 400 km for Hayden and he was able to peak the signal up to 5/6. Luckily, Adrian VK3HEQ was out mobile and was able to respond to Hayden's calls via the repeater.

Please remember to send through any 2 and 70 FM DX reports to Leigh VK2KRR at vk2krr@bigpond.com

ar

"Hey, Old Timer..."

If you have been licensed for more than 25 years you are invited to join the

Radio Amateurs Old Timers Club Australia

or if you have been licensed for **less than 25 but more than ten years**, you are invited to become an **Associate Member** of the RAOTC.

In either case a **$5.00** joining fee plus **$8.00** for one year or **$15.00** for two years gets you two interesting OTN Journals a year plus good fellowship.

Write to
RAOTC,
PO Box 107
Mentone VIC 3194
or call Arthur VK3VQ on **03 9598 4262** or Bill VK3BR on **03 9584 9512**,
or email to raotc@raotc.org.au
for an application form.

Modifications to the KR400 rotator

By Barry White VK2AAB

I had the unfortunate experience of a book falling on one of the switches of my rotator control box, sending the rotator to one end and burning out the motor.

I rewound the motor, which was not all that hard to do.

However, once bitten twice shy. I decided to fit microswitches as limit switches to the rotator. I also now have my rotator controlled by my Pactor BBS's computer. This system sends the rotator to the counter clockwise end on a reset occurring and limit switches are essential in this type of unattended service.

Also if you use rotators to follow satellites then you should also have limit switches.

It is a quite straight forward job. Because the circuit is interrupted by the limit switches it is necessary to remove the starting capacitor from the control box and fit it into the rotator itself. It will fit just behind the terminal block.

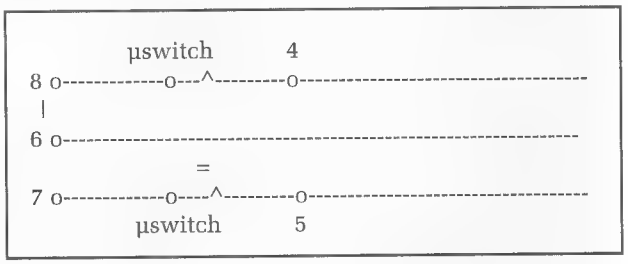
There are a number of preliminary steps you must take before opening the rotator and I can assure you it will save considerable time. Connect up the rotator on the bench and send it to due north. Measure the resistance between the arm of the potentiometer and each end. If it is not the same then move the rotator until it is the same. Then with a marking pen mark the sides of the rotator so that you can put it back together the same way. With the rotator upside down undo the bolts that hold the rotator together. Hold the rotator together and turn it over so that it is right side up.and you can now lower the ring holding the ball bearings. Watch out that you don't spill ball bearings everywhere. Be careful there is another set of ball bearings.

You can now remove the top of the housing.

You can now see as in the photograph where the lever which is the mechanical stop is located on top of the plate. If you look inside the top housing you will see that there is a part of the diecast that comes around and pushes the limit stop lever. This is hinged so that the rotator can get a full 360 degree rotation. The limit switches are operated by this lever.

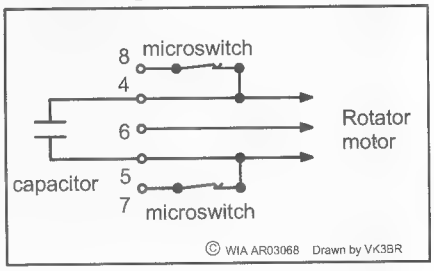
Note the ring gear just below the internal top plate. It has four blocks moulded into its casting. They are not the same size. One is larger than the others. This one fits into the top casing on the opposite side from the part of the top housing moulding that operates the limit lever. If you positioned the rotator correctly it should be alongside the limit lever. If for some reason it is not midway between the limit lever stops then lift the ring gear clear of the potentiometer gear and move it until it is midway between the stops. Replace the ring gear and check the potentiometer.

The microswitches I used had 100 gram operating force at the ends of their operating arms and it worked very satisfactorily for some years. They had sufficient force to push the limit lever out of the way when the motor was reversed. However recently I found the rotator would not turn in one direction. At first I thought it was a faulty microswitch, but when I got the rotator on the bench it worked perfectly. I opened the rotator and after a while it failed and I could see that the limit lever stayed against the switch. I removed a pair of springs from an AA battery holder and fitted them under the adjacent set screws. Make sure that the springs press on the lever itself and not the microswitch arm.

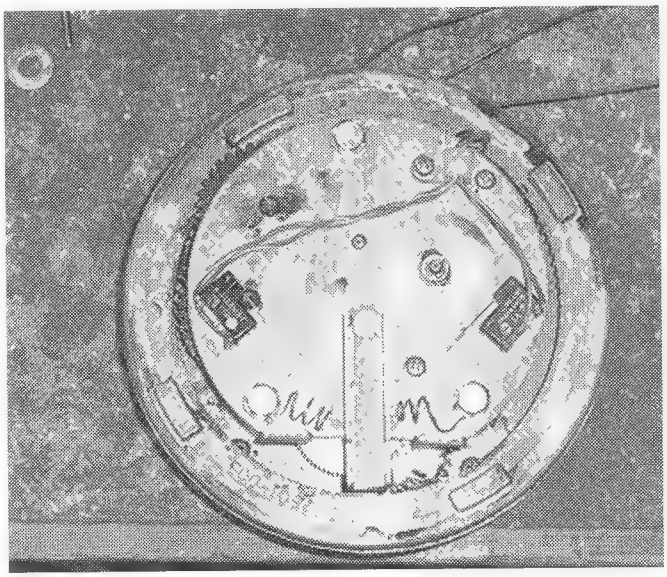


Microswitch wiring

The diagram shows the changes to the wiring. The capacitor is connected across the previously used teminals 4 and 5. The power is now supplied to

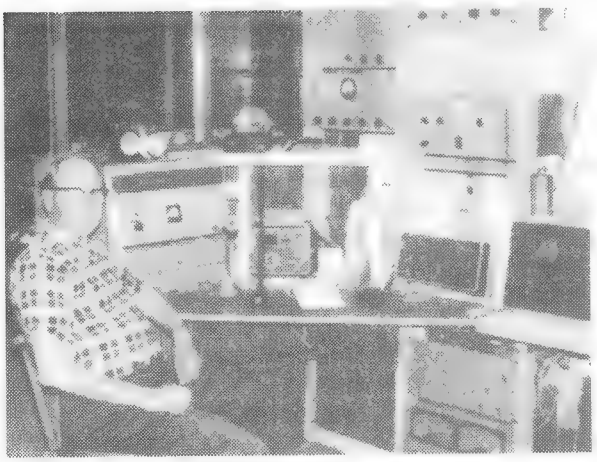


Rewiring of controls



Ring gear, limit stop lever, microswitch and additional spring positions

Roy Haynes VK3RU



Roy was born in Albert Park in 1916 and moved to Northcote where he attended Westgarth School. He enjoyed the outdoor life fishing and camping with his father and was also interested in radio from an early age. Roy left school during the depression and jobs were hard to find, but Roy always knew his path would be in radio and took any job that would lead in that direction. His first job at Footscray Meat Works packing kidneys didn't sound promising, but it lead to an electrical apprenticeship followed by many years of night school, an electrician's job with Northcote Council and finally joining the Post Master General (PMG) where he stayed until retirement. But life was not always indoors and radio. During his earlier days, Roy also enjoyed outdoor pursuits where he played golf, became a keen Albert Park sailor and enjoyed winter skiing at Mt Buller long before lifts were installed.

His radio career continued during wartime where he was involved in radar development at the PMG Research Laboratories. Post war, Roy remained with the PMG as a Broadcast Station inspector and finally, Officer in Charge of Radio Australia, Lyndhurst. Working at Lyndhurst became a multi skilled job not limited to broadcast transmitters, antennas and the Talking Clock machine. Roy found himself involved in sheep farming as the preferred means to manage grass at an appropriate height and a short venture into the drug world when Opium Poppies were found in the Lyndhurst Station garden.

Radio was always his passion and he was one of those fortunate people who worked and played in the field he loved. It is not clear when Roy first became licensed, however an Experimental Licence was awarded to him by the Post Master General during 1948 along with his callsign VK3RU.

Roy retired at 65 and spent much of his retirement in and around his radio shack where he was a great experimenter. His original station equipment was home brewed to a very high standard with antennas modelled on the spider webs and curtains at Lyndhurst. As commercial amateur gear became more readily available, some of the old was replaced with more modern equipment covering 160 m through to 70 cm. Even with this capability, Roy spent most of his time on 2 or 40 metres usually talking with his mates. Possibly one of Roy's proudest radio moments was receiving his award from NASA for involvement in early Apollo missions and his certificate was prominently displayed in his shack. Roy's health slowed during the early '90s following a stroke, but he still maintained regular 2 m contact with Bill VK3KBL, Bert VK3BH and Max VK3ZCW until very recently and he was an active member of their group luncheons.

Roy was a quiet, undemanding man who lived simply and loved his family and his radio.

David Williams Vk3KAB

Modifications to the KR400 rotator *continued*

terminals 7 & 8, which previously were unused. Terminal 6, the motor common is unchanged.

One normally closed contact of a microswitch is connected between terminal 4 & 8 and the other between 5 & 7.

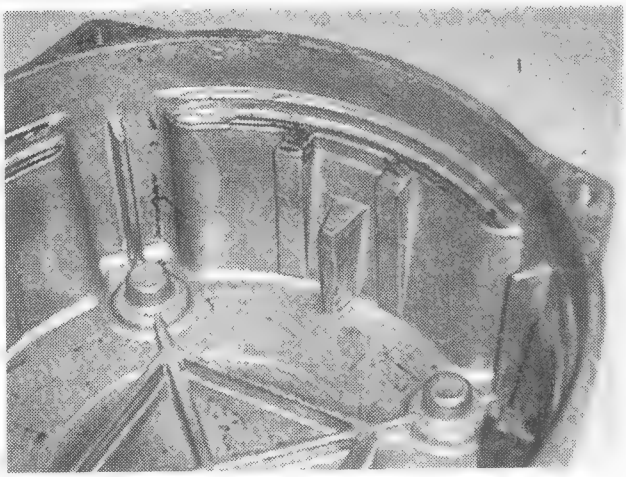
The controller now supplies power to terminals 7 & 8.

Adjust the arms of the microswitches so that they operate with at least 2 mm before the limit lever hits the stop. This should give reliable operation.

Reassemble in the reverse order but before you replace the top housing check that the potentiometer has not moved by ensuring that the resistance either side of the arm is the same. Likewise the large block on the ring gear should be centred between the limit lever stops.

After assembly operate the rotator and check its travel at each end and that it switches off reliably. You can hear the brake being dropped when the microswitch operates.

Since all this effort it has occurred to me that it should be possible to sense the increased current when the rotator hits the end stop. There are some problems of logic with doing it this way, mainly because of the indeterminate conditions after a power failure for different types of controller.



View under the top housing showing the rib which operates stop lever

HF Predictions

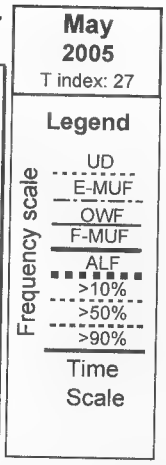
by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

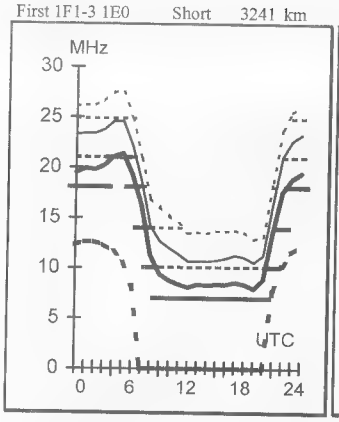
- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

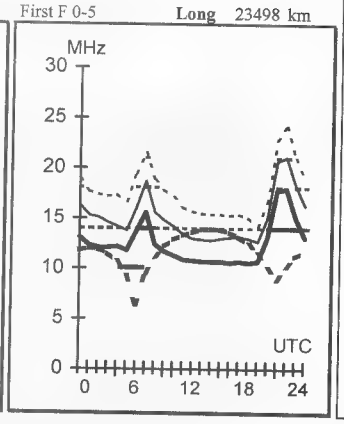
May 2005
T index: 27



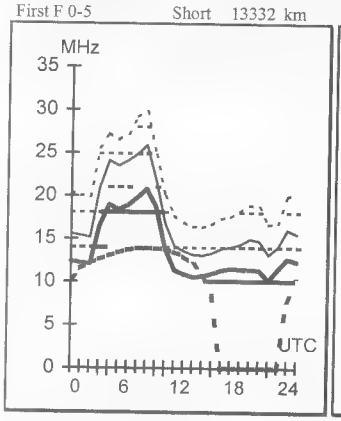
Adelaide-Auckland 104
First 1F1-3 1E0 Short 3241 km



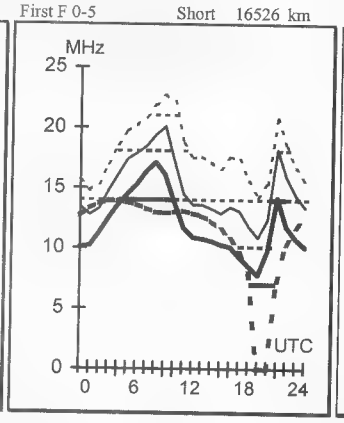
Brisbane-London 147
First F 0-5 Long 23498 km



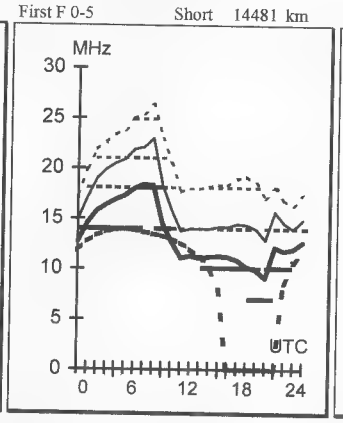
Adelaide-Cairo 288
First F 0-5 Short 13332 km



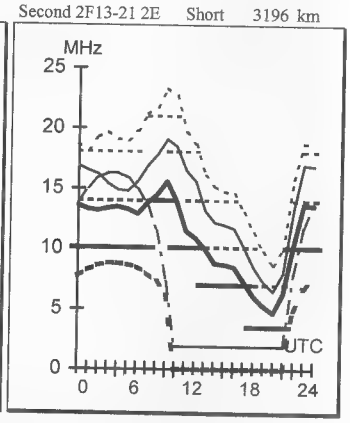
Brisbane-London 327
First F 0-5 Short 16526 km



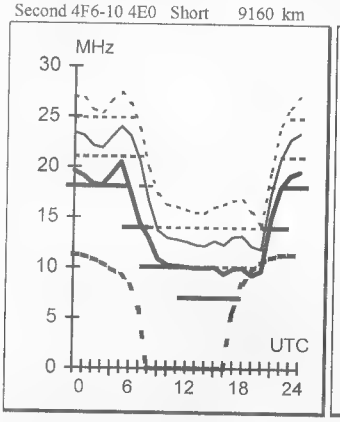
Canberra-Moscow 317
First F 0-5 Short 14481 km



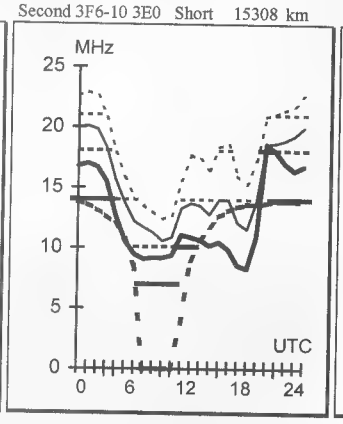
Darwin-Manila 340
Second 2F13-21 2E Short 3196 km



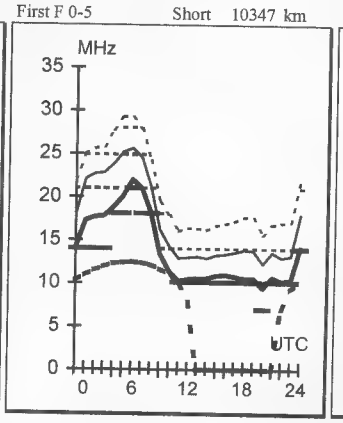
Adelaide-Honolulu 57
Second 4F6-10 4E0 Short 9160 km



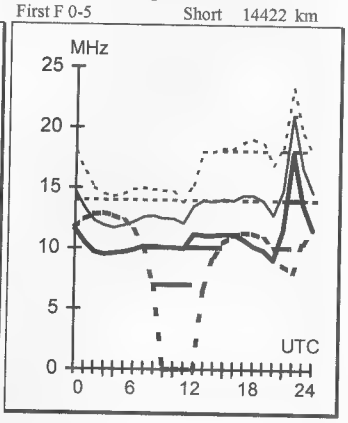
Brisbane-Ottawa 52
Second 3F6-10 3E0 Short 15308 km



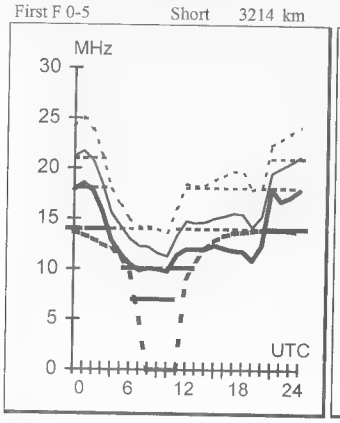
Canberra-New Delhi 303
First F 0-5 Short 10347 km



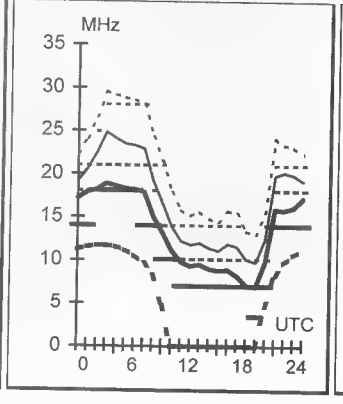
Darwin-Santigo 157
First F 0-5 Short 14422 km



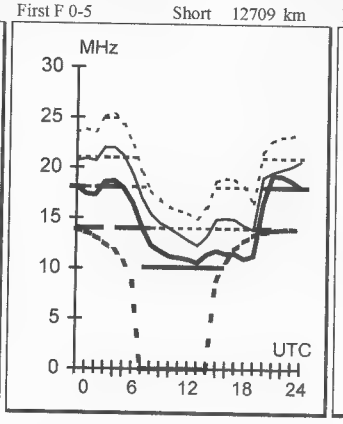
Adelaide-New York 114
First F 0-5 Short 3214 km



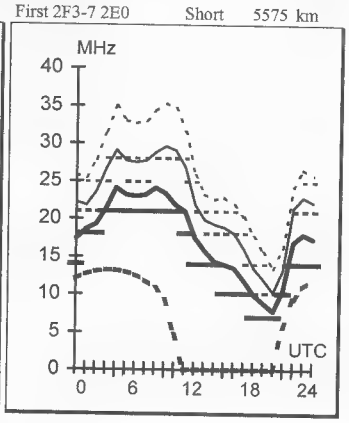
Brisbane-Tokyo 348
Second 3F6-10 3E0 Short 7159 km



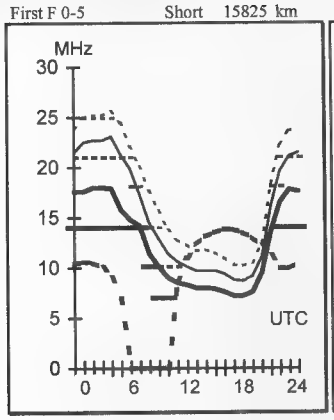
Canberra-Seattle 48
First F 0-5 Short 12709 km



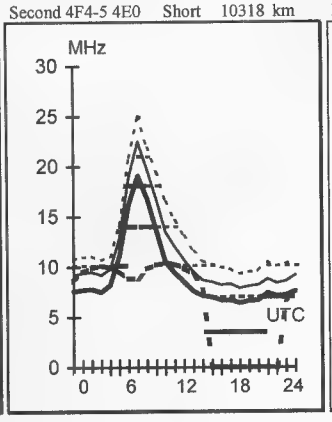
Darwin-Seoul 356
First 2F3-7 2E0 Short 5575 km



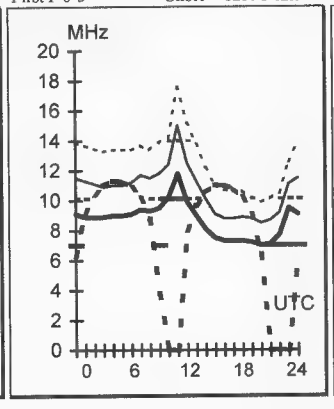
Hobart-Barbados 134
First F 0-5 Short 15825 km



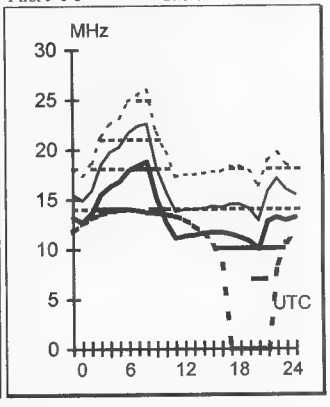
Melbourne-Capetown 222
Second 4F4-5 4E0 Short 10318 km



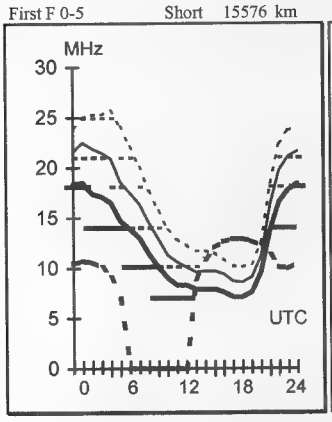
Perth-Buenos Aires 185
First F 0-5 Short 12591 km



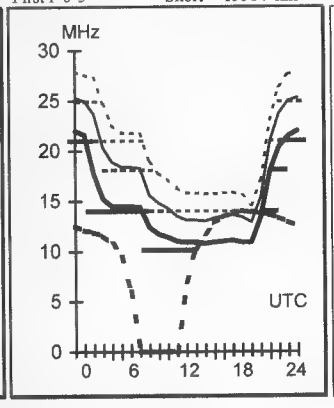
Sydney-Budapest 306
First F 0-5 Short 15779 km



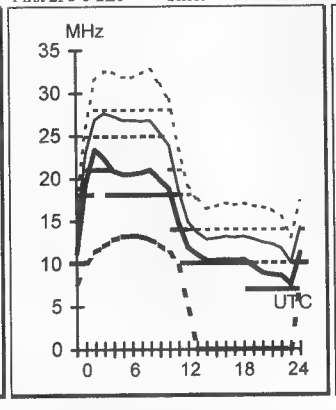
Hobart-Lima 133
First F 0-5 Short 15576 km



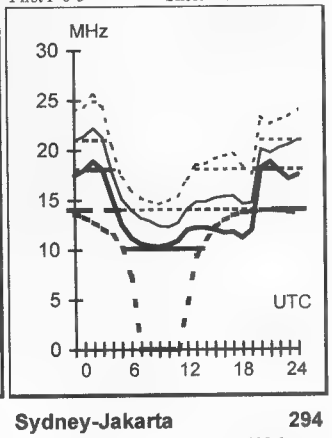
Melbourne-Miami 94
First F 0-5 Short 15584 km



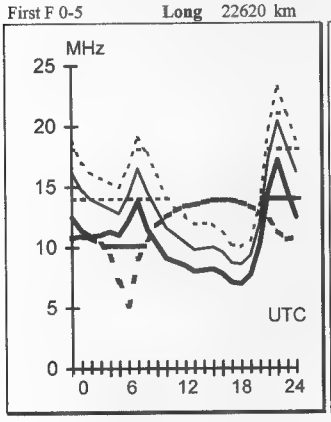
Perth-Columbo 312
First 2F3-5 2E0 Short 5768 km



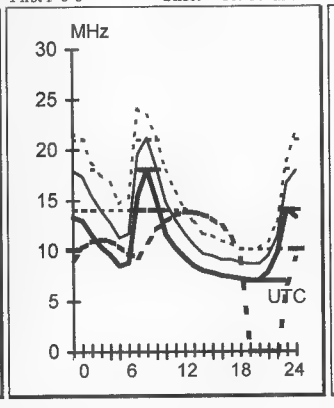
Sydney-Chicago 62
First F 0-5 Short 14876 km



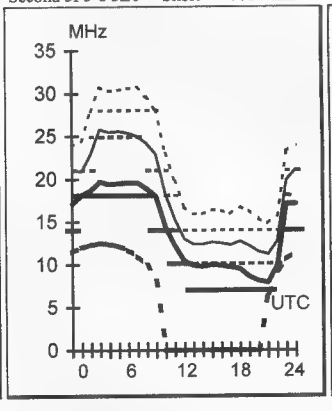
Hobart-London 123
First F 0-5 **Long** 22620 km



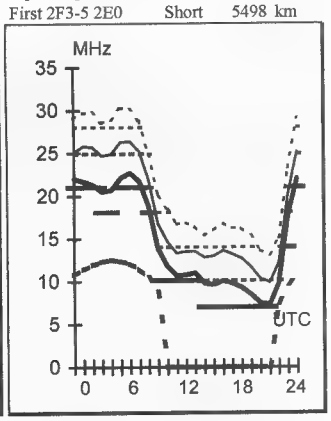
Melbourne-Senegal 219
First F 0-5 Short 16910 km



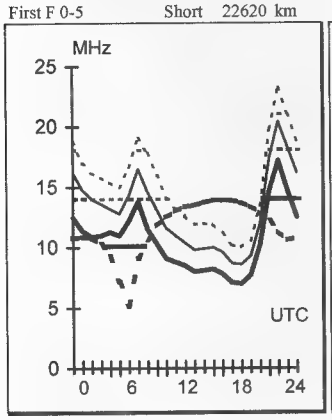
Perth-Osaka 17
Second 3F5-8 3E0 Short 7684 km



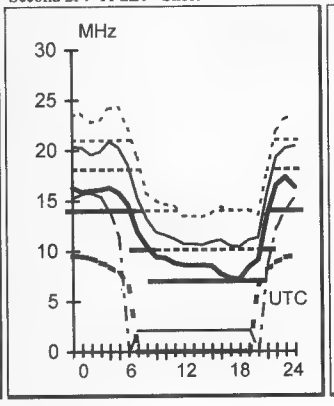
Sydney-Jakarta 294
First 2F3-5 2E0 Short 5498 km



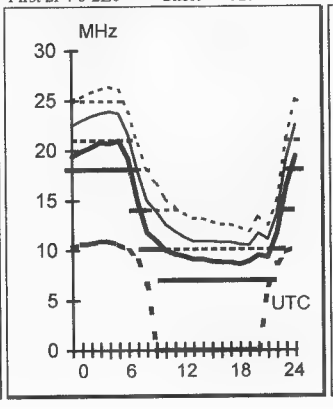
Hobart-London 123
First F 0-5 Short 22620 km



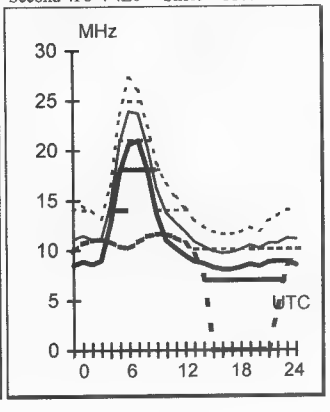
Melbourne-Suva 65
Second 2F9-11 2E0 Short 3914 km



Perth-Wellington 119
First 2F4-5 2E0 Short 5255 km



Sydney-Pretoria 230
Second 4F3-4 4E0 Short 11063 km



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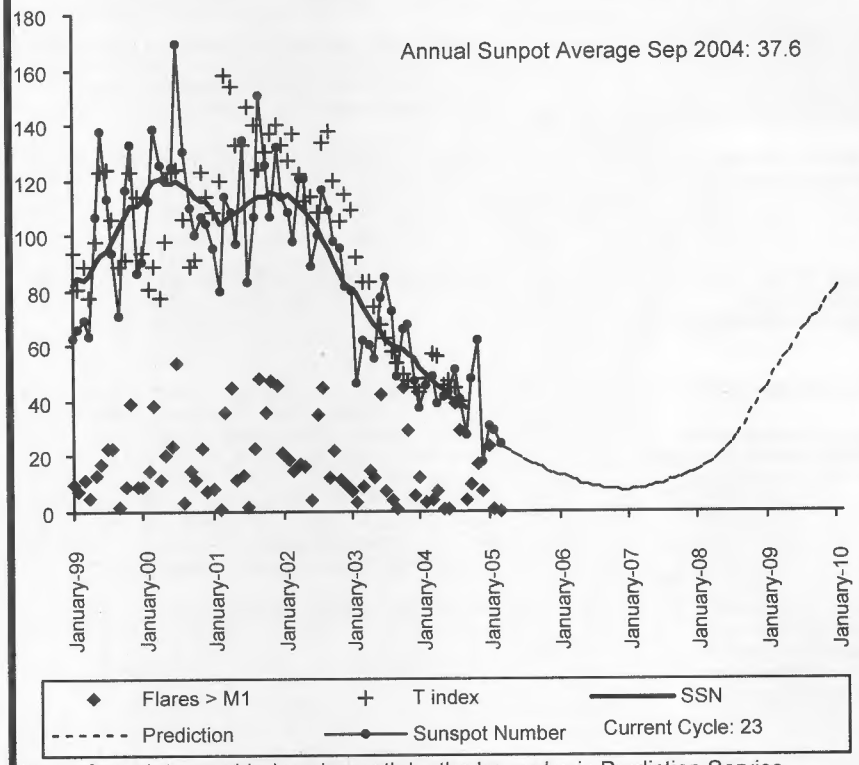
Monthy Sunspot Average Mar 2005: 24.8

Annual Sunpot Average Sep 2004: 37.6



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Directory

The Amateur Service:

a radio communications service for the purpose of self training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique with a personal aim and without any pecuniary interest. 1.56 ITU Radio Regulations.

The Wireless Institute of Australia represents the interests of all amateurs throughout Australia.

WIA membership fees are: ★ **$ 75 for full members (F grade),** ★ **$ 70 for pensioners and students (G and S grade), and** ★ **$ 50 for membership without 'Amateur Radio' (X grade).** ***Payment direct to National office.***

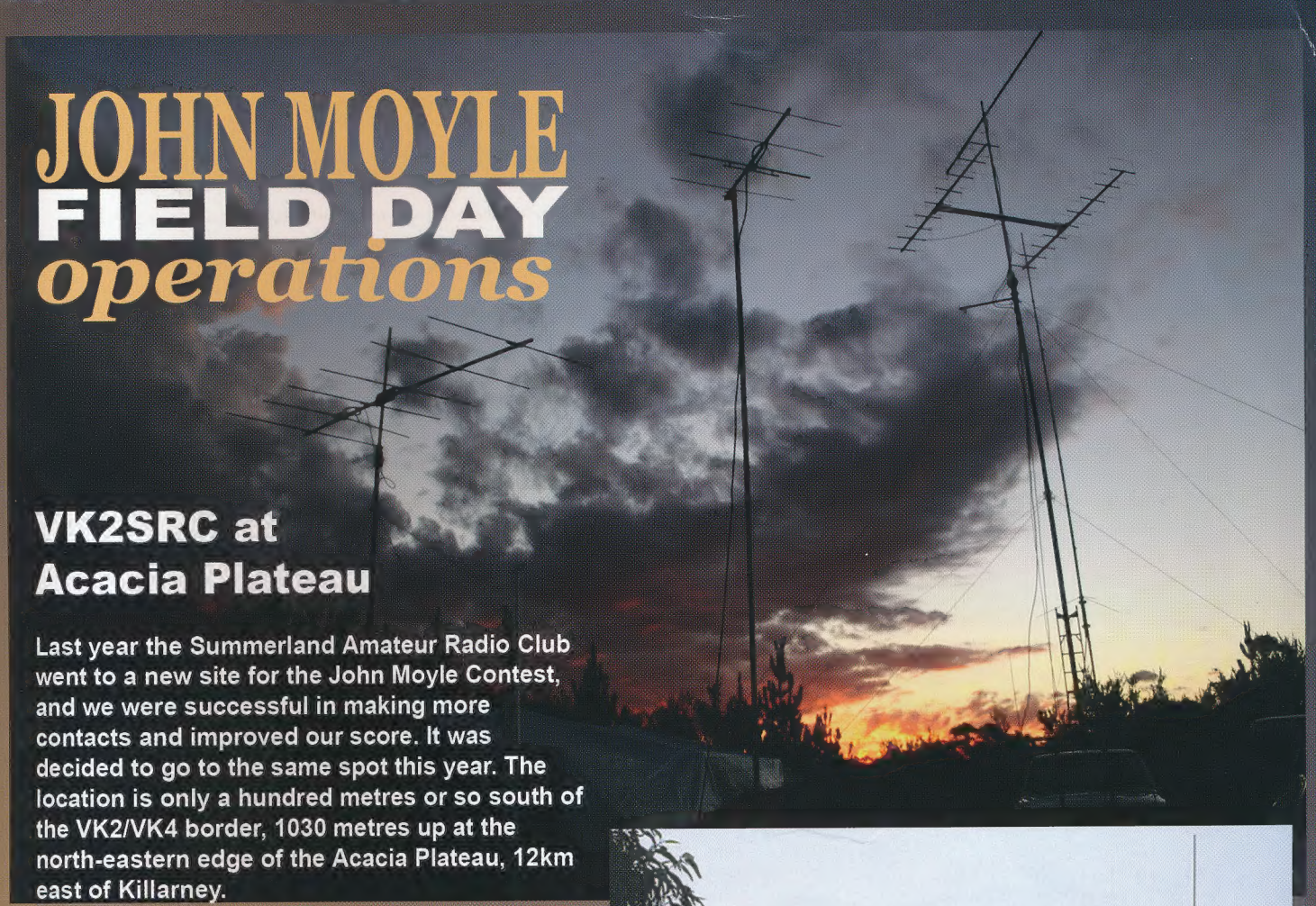
National Office	Contact	News Bulletin Schedule
10/229 Balaclava Road, Caulfield North VIC 3161, PO Box 2175 Caulfield Junction Vic 3161 Australia	Phone 03 9528 5962, Fax 03 9523 8191, 10am to 4pm daily, nationaloffice@wia.org.au http://www.wia.org.au	Subject to change see www.wia.org.au follow national news prompts. Contact nationalnews@wia.org.au National VK1WIA news is distributed to all states.

Advisory Committees	Contact	News Bulletin Schedule
VK1 Australian Capital Territory VK1WX Alan Hawes VK1ZPL Phil Longworth VK1ET John Woolner VK1GH Gil Hughes	secretary@vk1.wia.ampr.org	Sundays at 11.00 am VK1WIA 7.128, 146.950,438.050 Canberra Region Amateur Radio Club Email newsletter will be sent on request to president@vk1.ampr.org
VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9885 9261 advisory@wiavic.org.au	VK1WIA Sunday 11.0am via HF and major VHF / UHF rptrs
VK4 Queensland VK4ERM Ewan McLeod VK4ZZ Gavin Reibelt VK4KF Ken Fuller	Phone 07 3221 9377 qac@wia.org.au ewan.mcleod@bigpond.com	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK5 South Australia and Northern Territory VK5NB Jim McLachlan VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 jimac@picknowl.com.au peter.reichelt@bigpond.com vk5atq@chariot.net.au	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ advisory@vk6.net vk6ne@upnaway.com vk6xv@bigpond.net.au	VK1WIA Sunday 9.0am via WIA network
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 3.570MHz LSB, 146.700 MHz FM (VK7RHT South), 53.825MHZ FM (VK7RAD South), 147.000MHz FM (VK7RAA North), 146.750 FM & 53.825MHz (VK7RNW North West), 146.625 MHz FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27MHz CB - 27.225MHz LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090MHz LSB & 14.130MHz USB

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

JOHN MOYLE FIELD DAY *operations*



VK2SRC at Acacia Plateau

Last year the Summerland Amateur Radio Club went to a new site for the John Moyle Contest, and we were successful in making more contacts and improved our score. It was decided to go to the same spot this year. The location is only a hundred metres or so south of the VK2/VK4 border, 1030 metres up at the north-eastern edge of the Acacia Plateau, 12km east of Killarney.

On our previous visit, we could see across to some of the spectacular rocky peaks around Mt.Barney and to Mt.Superbus, the highest peak in northeast VK2. This time, we found the site hemmed in by thick pines and hakeas, which had tripled in height. Fortunately we had the benefit of tall portable towers to get the antennas in the clear.

more details in News from...

Elizabeth ARC John Moyle Field Day 2005

Four members of the EARC decided to operate independently in the John Moyle Field Day, but to operate from two sites Wirra Picnic Ground and Hope Hill. These sites are about 8 km apart. Hope Hill is a good VHF/UHF site and Wirra Picnic Ground has plenty of flat area for HF wire aerials.

Right: Colwyn VK5UE's "Beetle with antenna"

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